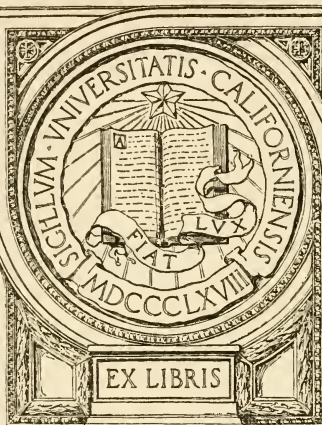


PREHISTORIC
TIMES AND MEN
OF THE
CHANNEL ISLANDS.
BY J. SINEL.

GIFT OF
JANE K. SATHER





Digitized by the Internet Archive
in 2008 with funding from
Microsoft Corporation

PREHISTORIC TIMES & MEN
OF THE
CHANNEL ISLANDS.

PREHISTORIC TIMES & MEN

OF THE

CHANNEL ISLANDS,

By JOSEPH SINEL,

Hon. Member of the "*Société Jersiaise*," (Archaeological and Antiquarian Society of Jersey), and Curator of the Museum; Member of the Guernsey Society of Natural Science and Local Research, &c.

Author of "The Geology of Jersey"; "An Outline of the Natural History of our Shores," &c.

With a Foreword by Professor KEITH, M.D., F.R.S., &c.,
Conservator of the Museum of the Royal College of Surgeons, England; President of the Royal Anthropological Institute of Great Britain.

Printed and Published by
J. T. BIGWOOD, States' Printer,
JERSEY.

1914.

CONTENTS.

| CHAP. | PAGE. |
|---|-------|
| FOREWORD | I |
| AUTHOR'S PREFACE | IV |
| I. Introductory | 1 |
| II. The Classification of Prehistoric Human Industries... The Eolithic Age, The Paleolithic Age, The Neolithic Age, The Bronze Age. | 8 |
| III. The Rise and Progress of Archaeological Discovery... | 26 |
| IV. Physical Geology of the Channel Islands | 32 |
| V. Local evidences of Early Man Cave Dwellings. | 43 |
| VI. Absence of evidences of the later Paleolithic Races... | 64 |
| VII. Early Neolithic (Tardenoisien) Period | 67 |
| VIII. The later Neolithic (Robenhausian) Period | 80 |
| IX. The Bronze Age | 89 |
| X. The Chronology of local Prehistoric relics... .. | 92 |
| XI. These Islands and their people in Prehistoric Times. | 101 |
| ADDENDA | 124 |
| The Submerged Forest.—The Caves of the Coast. Evidences of Glaciation in the Islands.—The presence of Flint in the Islands.—The Submerged Valleys and other depressions around the Channel Islands. | |

LIST OF ILLUSTRATIONS.

| | PAGE. |
|--|--------|
| Position of the Channel Islands prior to their separation from the Continent | 35 |
| Position of Jersey with land 60 feet higher than at present | 37 |
| Section of soil beneath St. Helier | 40 |
| Cave Dwelling, St. Brelade (Vertical section)... .. | 58 |
| Cave Dwelling, St. Brelade (plan of floor) | 60 |
| Grantez Dolmen (plan of floor) | 85 |
| | MAP. |
| Relative position of the Islands with the English and French coasts | I. |
| Prehistoric Remains in Jersey | II. |
| Prehistoric Remains in Guernsey | III. |
| | PLATE. |
| Section of Cliff in Beleroute Bay | I. |
| Early Chellean or Strepyan Flint Implements | II. |
| Flint Implements of Acheulian type | III. |
| Mousterian Cave dwelling, St. Ouen (from the sea) ... | IV. |
| Mousterian Cave dwelling, St. Ouen (entrance) | V. |
| Early Mousterian Implements | VI. |
| Mousterian Cave dwelling, St. Brelade (from tide margin) | VII. |
| Mousterian Cave dwelling, St. Brelade (during exploration) | VIII. |
| Mousterian Flint Implements | IX. |
| Teeth of <i>Homo Breladensis</i> | X. |
| Neolithic Tomb and section of Strata | XI. |
| Neolithic Tombs | XII. |
| Skull from Neolithic Tomb | XIII. |
| Skull from boulder clay | XIV. |
| Faldouet Dolmen | XV. |
| Grantez Dolmen | XVI. |
| Neolithic Stone axes | XVII. |
| Neolithic axe and hammers | XVIII. |
| Neolithic Milling stones | XIX. |
| Gold Torque | XX. |
| Submerged Forest, St. Ouen | XXI. |

FOREWORD.

BY ARTHUR KEITH, M.D. F.R.S., ETC.

IT must have been early in 1911, that a tall, engaging gentleman entered my workroom at the Royal College of Surgeons, and spread before me the contents of a little box which he took from his pocket.

My visitor was Mr. R. R. Marett, Reader in Social Anthropology at the University of Oxford — a gentleman who needs no introduction to the people of the Channel Islands, for he is one of them.

In the little box were some human teeth which, as they were spread before me, proclaimed themselves at once as those of a member of that strange race of humans that lived in Europe during one of the milder intervals of the Great Ice Age, and which are known to all the scientific world as “Neanderthal man.”

Of these extinct men,—who differed as widely from us as sheep differ from goats in all their parts—we have not so far traced remains in England, but it is plain that they lived in Jersey, for these teeth had just been discovered, together with remains of Pleistocene animals in a cave dwelling at St. Brelade, in that Island.

I mention these teeth because they not only brought me the friendship of Mr. Marett, but also that of the writer of this charming little book, Mr. J. Sinel.

They did more, they brought me to Jersey and placed me in contact with the scenes which are here so well described.

Mr. Sinel has read the history of his beloved Islands as it is written by the sun, the wind, the sea and the frost, and of their ancient inhabitants as it is told by their relics. He has obviously read aright and this book tells the story as he has read it.

I have good reason to remember Jersey. Delightful were those occasions when, amid the dunes and the strata sections, Mr. Sinel showed me how he had deciphered the hieroglyphics in which are recorded the events of far back times. Also the hours spent in the well-appointed museum of the *Société Jersiaise*, wherein are housed the treasures which are witnesses of the facts brought forward in the pages which follow, and that illustrate the wonderful story of the long ago.

We are only now beginning to obtain a glimpse of the vistas of human endeavour which have gone before us, and to realise the immensity of the human period even as recorded in our immediate neighbourhood.

The ancient feuds between the early rulers of these lands seem matters remote enough for most of us when we begin to reckon up the past, but here in this little book, when we read of the men who first trod this soil, we realize more fully than ever that even the Roman Conquest is but an affair of yesterday.

Mr. Sinel tells his story graphically and fully, yet in such a way that he who runs may read, and I can

only wish that the reader's interest in it will be equal to my own.

I regret that time did not permit me to visit Guernsey and to have personal introduction to the zealous band of workers in the same field of research over there. But this is possibly a treat in store.

Meanwhile I heartily commend this little volume as a valuable contribution to our knowledge of the far back history of our race.

AUTHOR'S PREFACE.

HAVING on various occasions contributed to the local press and to one or two scientific journals, the results of some of my observations on the evidences of prehistoric man in these Islands, I have been asked by many friends to place such observations in book form, and it is with pleasure that I now comply with those requests.

The diversity of opinion which, to some extent, exists on the whole subject of early man, makes the task a little difficult, and some of the conclusions at which I have arrived may perhaps appear somewhat venturesome, but I have followed the precept that it is the duty of the scientific observer, not only to describe facts as they present themselves, but to draw such conclusions from them as the attendant circumstances dictate, without looking to previously expressed opinions for guidance.

With regard to the antiquity of the early races of man, it will no doubt appear to some of my readers that I am on the side of the extremists, and such is actually the case; not on account of the fascination which long rows of figures possess, but from absolute conviction. For instance, I go down to the low tide limit in St. Clement's Bay, and sit upon a huge semi-carbonized tree trunk which lies there, held by its roots in the firm peaty soil, and remember that I sat upon that trunk half a century ago, and that during that interval there has been no apparent change in

its form or position. Then tracing the history of this tree, I see it, once a monarch in the midst of a vast forest; then dying under the influence of an approaching sea, falling, and buried in wind-blown sand and then submerged to a depth of sixty feet or more; Again, by earth oscillation, lifted high above the waters and forming part of the substratum for another vegetation; Finally,—stripped of the strata which had accumulated upon it—once more beneath the sea.

What period has elapsed since this tree was in leaf and the birds built their nests amid its branches?

No cataclysm has played part in its history; the soil in which it is rooted is undisturbed, so that even the hoof-prints of the ancient oxen that roamed around are clearly defined. All the surroundings indicate that these changes are simply due to the same slow process of undulation of earth's surface as that which is proceeding at this moment.

When I look back along the beaten track of history to Roman times, I find that the twenty centuries which have slipped by since then have wrought but little change in the configuration of the land; a certain amount of subsidence and nothing more.

How long is it then since my tree was growing? Twenty to thirty thousand years at least seem to be called for to account for all its vicissitudes, and yet in the soil around this tree, and even beneath the roots of its neighbours, are relics of *Neolithic* man,—of races which, compared with *Palcolithic* man, are as of to-day.

Again, when I stand on the highest land of the Northern coast of Jersey, survey the Channel Archipelago, and remember that since man first trod this soil, these Islands—all through the same slow process of earth's undulation—have been alternately continental and insular many times, and that where now is sea, sub-tropical and sub-arctic forests have alternated, either passing by imperceptible change from the one to the other, or appearing in turn at different periods of land elevation.

Then I remember that two glacial episodes have passed; that herds of primitive elephants, the lion, the hippopotamus, and other warmth-requiring animals, have roamed these lands, and that so have the mammoth, the woolly rhinoceros, the reindeer, the arctic hare, and a host of other denizens of icy regions.

Nature does not work by bounds, but with slow deliberation, yet throughout these shifting scenes—throughout this long march of ages—man has lived here, and left his traces.

These are some of the reasons for the faith which is in me with regard to the vast antiquity of man, even as he is represented in this little area, and which I think I shall make clear in the pages that follow.

Among the many friends whom I have to thank for valuable assistance are, firstly, the *Société Jersiaise*, not only for the fact that the more important portion of what I am bringing forward—the cave researches—is almost entirely based upon its work, but for the loan of most of the

blocks here used in illustration, and for assistance and kindness in many other ways.

Dr. Keith, for having checked my manuscript and honoured me with a "Foreword."

Mr. E. F. Guiton, for having taken special photographs for me and assisted me in many ways. Capt. H. S. Lawson, Mr. H. J. Baal and Mr. F. Le Cornu, for indicating to me strata in which they had noticed human evidences, and Mr. A. Collenette for many notes on Guernsey.

J. SINEL.

Jersey, September 1st, 1913.

CHAPTER I.

INTRODUCTORY.

IN mid-tertiary times the Channel Islands were an integral portion of the higher plains of Normandy, and were originally separated from these and from each other through erosion by the sea of softer rocks by which, until then, they were invested.

Then in subsequent periods of land elevation and subsidence, they have been alternately reconnected with, and separated from, the mainland and each other a number of times. A study of the strata on the shores, shows that during the quaternary period, Jersey and Alderney have been reconnected with the Continent not less than three times, and Guernsey, Sark and Herm, not less than twice.

Each of these periods of reconnection has revealed the islands as elevated areas in the surrounding plains, with scarped and rugged granitic cliffs tunnelled with innumerable caves and grottoes, rising from 300 to 500 feet above those plains.

When these points are considered, it will readily be surmised that the islands must be rich in evidences of the early races of men that peopled this part of Europe, for their elevated cliff-caves, offering shelter and safe retreat, and the low-lying forest plains around, the fruits and roots of the season, rich hunting grounds and fuel reserves, would present ideal conditions for a hunter's life.

Nor would the archaeologist who had thus surmised be disappointed, for within their limited field, relics representing human succession from the earliest paleolithic (apparently even eolithic) to the latest neolithic times, are present on all sides.

Yet strangely, with the exception of various researches into their dolmens, dating from about the middle of the last century it is only within the last couple of years that the islands have received the attention they so well deserve, and that systematic research into their paleolithic records has been undertaken.

The first actual demonstration that some of their cliff-caves had been the dwelling places of primitive man is, I believe, due to my friend Mr. S. Dancaister and myself who, in 1881, proved traces of Paleolithic occupation in the little cave known as "la Cotte à la Chèvre" at St. Ouen, on the North coast of Jersey.

It was, however, only in 1910 that serious and systematic work in the subject of Paleolithic research was begun, this work being entirely that of the local archaeological and antiquarian society—the *Société Jersiaise*.

The splendid results which have crowned the work of this Society will be fully explained in the pages that follow, but meanwhile I may mention that it has brought to light some of the earliest evidences of man on record, represented, not only by his handiwork, his hearths and implements, but by his actual remains, and also those of his congeners—a pleistocene fauna.

Apart from the records of the caves, the islands have other evidences of the very early races, for scattered over the moorlands, beneath the clays that date from glacial times, and often exposed on the surface of the ploughed fields, chipped flints, and finished flint and other stone implements are constantly brought to light.

The earliest portions of the neolithic period, represented by implements and other relics, are traceable beneath the levels of the submerged forest lands and by some tombs and human remains in Jersey, and the later ones by cromlechs, dolmens, menhirs, &c., throughout the islands.

The bronze age, although less fully represented, has left some valuable relics as we shall see in due course.

As this little book is intended for the general reader rather than for those versed in Archaeology, it may, however, be well, before touching upon local details, to devote a little space to an outline of Archaeology in general, to describe the industries that mark each division of human succession, and to explain the various terms that must of necessity be used in dealing with these. For instance, as it is customary to refer to some of the races of early man as having lived in "glacial," "interglacial," or "post-glacial" times, as the case may be, it will be well, in the first place, to explain, as briefly as the subject will admit, the meaning of these terms.

In this part of Europe the dwellers are now enjoying a mild and fairly equable climate, but it

was not always so. If not actually down to the latitude of these islands, still at a comparatively short distance to the north of them, the ice-sheet of the north has more than once crept down, and at one time at least, the seas have been frozen over, and a *mer de glace* has spread as far south as the latitude of Hampshire.

The much controverted question as to whether the climatic phases known as "glacial periods" are due to astronomical, to geological, or to other causes, it is not necessary to touch upon here, the reader will find the subject fully discussed in Prof. Geikie's *Great Ice Age*, Sir R. Ball's *Causes of an Ice Age*, and in the writings of other masters of geological and astronomical science. It will here suffice to say that such periods have occurred, and have left the marks of their presence, not only in the earth's strata, but in the botany and zoology of each affected region.

Although the Channel Islands are generally supposed to have been outside the limits of the actually glaciated area (see addenda), still, beds of clay, interstratified with layers of rock detritus, and sometimes containing large boulders that have been washed down slopes from a great distance, mark at the very least its proximity, for these stratified, boulder-containing clays can only be the work of the torrential floods of melting snows,—the "glacial rubble-drift" of geologists.

Prof. James Geikie (*Great Ice Age*) says:—

"When all the regions to the North were swathed in perpetual snow and ice, it is not to be supposed

that the non-glaciated districts were clothed with much vegetation.

"Immediately South of the Northern ice-sheet, indeed, deep snow covering large tracts of country may have endured often for years notwithstanding the melting that must have taken place in summer."

It is to the summer meltings of such snow accumulations, during periods when there was little or no vegetation to bind the hilltop and hillside clays, that are due those layers of "glacial rubble-drift,"—in some places over fifty feet thick—so much in evidence in many parts of the islands.

They represent an "upper and a "lower" boulder clay, with evidences of a genial episode between them.

These deposits of generally accepted dates, then afford us some chronology in dealing with early man according as we find his relics beneath, between, or above them, which chronology will be discussed in a separate chapter.

For the non-geologist, it will also be well at this point to define the terms employed in geological record which have a bearing on anthropology.

The term "*recent*" is used to express the period which reaches back from this day until the glacial period. It covers the time of the later races of Paleolithic man, of Neolithic man, and of the Bronze and Iron ages.

Immediately preceding this was the "*Pleistocene*." This was characterized by periods of cold, with temperate intervals.

The duration of the Pleistocene is a matter on which authorities differ widely, the majority claim that it lasted at the very least some 150,000 to 200,000 years, but the modern tendency is to increase this estimate greatly, in fact the latest estimates for the duration of the Pleistocene period are given as from a million to a million and a half years.

This period covered the time of the earliest races of men of which we have up to this day any authentic record—the Chellean, Acheulian, and Mousterian or Neanderthal races ; including the far back Heidelberg remains—perhaps even the *Pithecanthropus* of Java.

Before the Pleistocene was the *Pliocene*. This period was a long one ; three or four times at least as long as the Pleistocene.

The climate of North-western Europe in Pliocene times was warm, and its fauna and flora were sub-tropical. It is now held by many that man occupied these regions at the end of those times, for human artefacts certainly do occur in Pliocene strata.

Before the Pliocene was the *Miocene*, a period of probably still much longer duration than the Pliocene.

Preceding the Miocene was the *Oligocene*, and before this the *Eocene*, a period in the geological record which carries us back into many millions of years.

The Eocene period is the one in which mammalian forms appeared, and the Oligocene is probably the one in which man as a genus, branched off from the stock which also gave rise to the anthropoid apes.

It will be noted elsewhere that some anthropologists claim the discovery of supposed human artefacts as far back as the *Oligocene* !

Now the Eocene, Oligocene, Miocene and Pliocene, together form that great division of geological time which is termed the *Tertiary*.

I cannot help feeling that some apology is due to many of my readers for these details, but I must once again remind them that I am not writing for the man of science but simply for the general intelligent public.

CHAPTER II.

THE CLASSIFICATION OF PREHISTORIC HUMAN INDUSTRIES.

UNTIL recent years the only attempt at a separation of the periods during which human industries were chiefly confined to the making of implements of stone, was to divide them into the *Paleolithic* or “Old Stone Age,” and the *Neolithic* or “Newer Stone Age.” The former was characterized by implements which—usually of flint—were simply chipped into the desired form, and the latter by the addition to such chipped flints, of axes and other implements of various kinds of stone which were finished with great care, mostly symmetrical, and often ground and polished.

But the discoveries of the last half century or so, have shown that the “Old Stone Age” must have represented a period which covered hundreds of thousands of years and included many races of men, each of these races being characterized by different types of implements and the association of such different types of implements with the remains of different types of animals.

Further than this, some recent researches reveal what appear to be humanly chipped flints in such geological strata as to make it all but certain that man—and man so advanced as to be an artizan—existed as far back as Tertiary times. To this immensely remote period—as regards human record—the term “Paleolithic” as generally understood,

fails to apply, and so the term "*Eolithic*" has been introduced.

Then again, the Neolithic period is now found to be a time so vast, and to cover, not one, but several races of men that it is necessary to subdivide it into two or three sections.

Finally, until quite recently, it was thought that between the Paleolithic and Neolithic periods there was a gap, and this was termed the "hiatus," but recent research has brought to light—as we shall see further on—abundant evidences of races of men between these, so that the gulf is bridged and the chain of human succession shown to be unbroken.

It has been said that classifications are only made to be unmade, but at all events, out of a dozen or more systems that have been suggested for the classification of pre-historic human relics, the following, which is that of de Mortillet,* is the one which is most widely accepted, and with but little modification, now in general use.

THE EOLITHIC AGE.

As already mentioned, fragments of flint which bear indications of having been intentionally chipped into such shapes as would render them serviceable implements have been found, not only in the upper strata of the Tertiary period—the *Pliocene*, but in still older deposits—*Oligocene*, a period which goes back into millions of years. So that, if such chipped flints really represent human workmanship, then man

* *La Préhistoire*, par Gabriel et Andrien de Mortillet, Paris 1910.

must have lived in these very regions in the time of the Mastodon and Deinotherium.

Many authorities, however, entertain grave doubts as to whether these chipped flints in tertiary strata represent human handiwork, and around the whole question there is, as Professor Sollas says, "a raging vortex of controversy."

De Mortillet is of opinion that such flints have been intentionally chipped but is slow to acknowledge the hand of man. "They are probably," he says "the work of some precursor of man," which involves a rather nice point, for it is not easy to determine at what particular point in his long history, man first qualified for his title.

The great trouble is that no human remains unquestionably referable to this period have been brought to light, and this is the strong point of the opponents of tertiary man. But there are other points to consider. For instance, as Professor Windle points out,*

"When such chipped flints are found in a district where flint does not naturally occur, then the evidence in support of their being the result of human workmanship is much strengthened."†

Again, the same authority, quoting Mr. Bell, says :

"The Paleolithic implement is, on the face of it, a very advanced and artistic production. Neither in form nor in workmanship does it show any indication

* Remains of the Paleolithic Age in England.

† (See note on occurrence of flints in Addenda.)

of the prentice hand, and far from being the firstborn of human tools, must represent the last stages in a long series of artistic developments."

Further reference to this debated question would be out of place, as well as unnecessary in this little volume, and the interested reader will find the various points fully discussed in all the recent publications on Archaeology.* The only reasons for such details as I have given is that later on we may consider whether relics of human industry belonging to those immensely remote times occur in the Channel Islands.

THE PALEOLITHIC AGE.

Whatever haze may still involve the subject of "Eolith man," the horizon becomes perfectly clear when we enter the paleolithic stage of his existence. Here, except on points of detail, the opinions of experts cease to be divided, and demonstrable facts take the place of hypotheses however well founded those may be.

The various periods into which the paleolithic age is divided, and the terms which are used to express those periods, are now generally accepted as follows, the terms being taken from districts which have furnished, either the first, or the best authenticated, records.

CHELLEAN PERIOD.

(From *Chelles*, Seine et Marne.)

Among human evidences in the lower deposits of quaternary times, are abundant flint implements of a well marked and constant type.

* See, for instance, *Prehistoric Man*, by W. L. Duckworth, Cambridge University series.

These are the "Hand-Axes" of British authorities—the "*Coups de Poing*" of de Mortillet.

These implements are formed from flint nodules, roughly chipped all around into a more or less pear-like form. As a rule they are massive, sometimes a foot, and rarely less than four or five inches in length.

They occur chiefly in old river gravels, in drift clay, and on moorland—rarely if ever in caves.

During the Chellean period the climate of this part of Europe was warm—it was an *interglacial* period, and the flora and fauna consisted of what we now term *Southern* forms.

In the same strata as are found the relics of human industry of this period there occur remains of the following animals, viz., two species of elephant—*Elephas antiquus* and *Elephas meridionalis*, one species of rhinoceros—*Rhinoceros Merkkii*, the hippopotamus, the cave-bear and cave-hyena, the sabre-toothed tiger and a species of lion. Except the hippopotamus, which has taken up its abode in southern lands, all these animals are now extinct.

Relics of the flora of that period are less in evidence than are the animal remains, but there are indications that it embraced the magnolia, the rose-laurel, the fig, and probably the palm.

Marking the evolution of the Chellean implement, and found in strata still lower down, where they are associated with the remains of extinct animals other than those above named, are other forms of implement, which seem to link Chellean with Eolithic times.

To the periods thus represented the terms "Strepyan" and "Mesvenian" have been applied,

but as there are still some undecided points connected with this part of the subject, it is as yet scarcely safe to use the terms in a general outline of classification.

ACHEULIAN PERIOD.

(From *St. Acheul*, Amiens, Somme.)

Although there are clear evidences of a blending of this period with the Chellean, still in its full development it is well characterized. The rough, pear-shaped implement here gives place to a lighter form, still made from an entire flint nodule, but finely and evenly chipped on two sides so as to bring it to a flat and very uniform shape, sometimes almond shaped, sometimes cordiform.

The fauna of the full Acheulian period shows that the climate was becoming colder, the hippopotamus seems to have disappeared from these regions, and the mammoth comes upon the scene. *Elephas meridionalis* had become extinct, and some authorities doubt whether *Elephas antiquus* had persisted until then. The flora also shows some modification, the whole indicating considerable climatic change.*

MOUSTERIAN PERIOD.

(From *Le Moustier*, Commune de Peyzac Dordogne.)

The implements of this period, although as a rule less elaborately chipped than those of the Acheulian, show a marked advance on these from the point of view of general utility.

They are no longer fashioned direct from nodules, but from flakes—large or small—split from the sides of nodules, the work of chipping, to bring them to

* See *La Préhistoire*, by G. and A. de Mortillet, Ed. 1910.

the desired form being performed on one side of the flake only, the other side being left flat and smooth, just bearing at the base that "bulb of percussion," which nearly always results when vitreous substances are fractured. By this means a sharp and clean-cutting edge is secured and a fairly neat and effective implement is the result. They are usually of that more or less lanceolate shape which de Mortillet terms the *Pointe à main*, and Evans, the "*Tongue-shaped implement*." In size they range as a rule from two to five inches in length.

This is the *typical*, and the most plentiful implement of the period, but there occur with these, others simply so chipped as to present a sharp point, these being apparently borers or piercers for making holes—probably for joining skins. Then there are flat flakes with more or less parallel sides, apparently knives or scrapers for cleaning and trimming skins and so forth, but this last form is not confined to the Mousterian period, for it persists through all successive periods of the stone ages, right into the latest Neolithic.

The question has often arisen as to whether the lanceolate implements—so very like spear-heads—were hafted, or in any way attached to handles.

De Mortillet is of opinion that they were not, but were simply used in the hand, hence his term for them "*Pointe à main*"—mentioning in support of his contention that the Tasmanians employed closely similar implements in the way he describes. This seems hard to credit, for one would think that the obvious advantage of a flint-tipped thrusting weapon,

and one so easily constructed, would have suggested itself to man so advanced in technique as to be the maker of these carefully wrought flint points.

The climate of these regions during the sojourn of Mousterian man must have changed from the comparatively mild finale of an interglacial period to nearly, if not quite, the full rigours of an arctic one.

Mousterian man had among his congeners the following animals, viz., the mammoth, woolly rhinoceros, bison, urus, two species of wild horse, many kinds of deer and several small bovids, the reindeer, musk ox, ibex, two species of bear, the glutton, stoat and weasel, the arctic hare, badger, beaver, lynx, wolf and fox. He also encountered a cold-enduring lion—a species of great size—and a leopard. Such at least are the animals that have left their bones mingled with the relics of the men of the period.

Thus, with a climate cold, and growing colder as the ice-sheet spread down from the north, Mousterian man took to the shelter of caves, and it is in these that we find the greater portion of his relics, with the remnants of his feasts alongside his voluminous hearths.

AURIGNACIAN PERIOD.

(From *Aurignac*, Haute Garonne).

At present the majority of archaeologists introduce this period here, among these being such authorities as Dupont, Arcelin, Pavat and Breuil. But on the other hand some are disposed to place it further on,

viz, subsequent to the *Solutrian*, de Mortillet being one of these.*

From the cultural point of view it certainly seems a great leap from the Mousterian to the Aurignacian, for in the former we see but evidences of the crude savage, whose highest attainments are represented by chipped flints which, however well they may be fashioned, are all on one plan, whilst amongst the Aurignacian relics we find evidences of high artistic talent,—bracelets in ivory, statuettes and subjects in bas-relief.† The flint implements found amongst the Aurignacian relics consist simply of long flakes which could serve as knives and some broader flakes rounded and bevelled at one end evidently used for dressing skins; all larger implements, such as daggers, &c., being made of bone or stag's horn.

In the Aurignacian period, severe glacial conditions had passed away and the climate was becoming more genial, although as far as has been observed the fauna seems to have been much the same as during the Mousterian.

SOLUTRIAN PERIOD.

(From *Solutré*, Saône et Loire).

In this period art becomes still more advanced. Besides carvings, &c., as in the foregoing, we now find abundant etchings on stone, bone and ivory.

* The arguments *pro* and *con* this order are fully given in an article by Prof. Breuil, entitled "L'Aurignacian pré-Solutrien. Epilogue d'une controverse," in the *Revue Préhistorique* for 1909, parts 8 and 9.

† Of course this represents replacement of race by race and not genealogical succession. On this matter the reader will do well to consult the Chapter on Human Evolution in Professor Duckworth's *Prehistoric man*.

The art of flint chipping has also greatly advanced, and the typical flint implements known as the "*Feuilles-de-laurier*" of de Mortillet, are marvels of fine chipping. They are, as de Mortillet's term implies, lanceolate in shape, thin, light and elegant—very much on the lines of those of recent North American tribes so frequent in museums.

Whilst, as one cannot but suppose, the climate in this period was still becoming more genial, there does not appear to be much difference in the fauna. De Mortillet gives, among the animal remains found in France associated with the Solutrian industry, the following:—cave bear, brown bear, badger, wolf, fox, glutton, pole-cat, hyena, cave leopard, lynx, marmot, arctic hare, mammoth, horse, wild boar, reindeer, wapiti, red deer, saiga antelope, bison (auroch) and the urus or *Bos primigenius*.*

MAGDALENIAN PERIOD.

(From the Cave of *la Madeleine*, Sarlat, Dordogne.)

This, and the Solutrian, are frequently combined in the term "Reindeer Period," as the reindeer, although present from Mousterian times, appears to have been more abundant in these more recent periods.

The Magdalenian period is characterized by a considerable change in its artefacts. Flint, about the most essential commodity in all the earlier industries (except, it seems, the Aurignacian) is now only

* The gradual transition to a milder climate in this period is however questioned by de Mortillet, who claims that the flora indicates an increase of cold. "The climate," he says, "was becoming colder and drier." There seems however some doubt on this point. See *La Préhistoire*, Ed. 1910, pp. 487 and 530.

requisitioned for flakes to be employed as knives. The one characteristic form being what is termed the "*Pointe à cran*."

This is shaped very like a short modern knife, pointed at the end and with a narrowed portion, or "*tang*," as if for insertion in a handle. Harpoons, daggers, &c., were now entirely made of bone, ivory and stag's horn.

It is in the Magdalenian period that paleolithic art attains its maximum. The classical etchings on ivory, bone and slate, with their spirited and lifelike representations of the mammoth, reindeer, hunting scenes, &c., are of the Magdalenian period, as are most of the now well known paintings of animals, &c., on the walls of cave-dwellings.

The climate in Central Europe during Magdalenian times must have approximated that of Southern Canada at the present day, the summers being hot, and the winters extremely cold. The fauna was much the same as that of the Solutrian period, the mammoth and the reindeer were abundant, but it seems the leopard and the hyena had passed from the scene. There is, however, much haziness with regard to this question, and an unmistakable etching of the head of a woolly rhinoceros amongst some Magdalenian relics, shows that it is probable that this congener of the, even then, very remote Mousterian man, was still to some extent living in Magdalenian times.

At the close of the Magdalenian period—that is at the horizon where the relics characteristic of the period

cease to occur, there was as I have already said, long supposed to be a gap in human succession, for in all stations which had been investigated, geological strata had accumulated over the Magdalenian relics and no further evidences of man were apparent until those of comparatively civilized "Neolithic" times were met with, and these last were associated with a totally different fauna—the fauna of to-day, with domesticated animals, polished stone implements and pottery. We were thus confronted with what was termed the "hiatus." But the research of recent years has led to the discovery of the existence of intermediate races, giving us an unbroken chain. In caves at Mas d'Azil (Ariege) la Touronne (Haute Garonne) Oban (Scotland) and other localities, ranging from Scotland to the Pyrenees, relics and other evidences which mark a later Paleolithic, or transitional period, have been found in fair abundance.

To represent this period, the terms "Azilian" and "Tourassian" are both employed, but the majority of archaeologists are in favour of the former.

AZILIAN PERIOD.

(From *Mas d'Azil*, Ariege).

The industries which mark this period do not show, as we should imagine, an advance in culture, but on the contrary, a decided retrogression, for the fine arts of the Magdalenians—etchings, carvings and paintings—disappear, and neither their like nor their quality again occur among the relics of prehistoric man.

Flint as an asset was still at a discount, blades and scrapers alone being made of this material, bone, ivory

and stag's horn being the materials employed for all else.

The harpoons were not round-shafted, light and elegant, as were those of the Magdalenians, but flat-shafted and coarse, and of a form which persisted through the following Neolithic periods.

The climate, it seems, in the Azilian period was much as it is to-day. The mammoth had become extinct, the reindeer had removed to northern latitudes and the red deer had become plentiful.

Whether pottery had yet been invented is an undecided point.

THE NEOLITHIC AGE.

TARDENOISIAN PERIOD.

(From *Fere en Tardenois*, Aisne).

The introduction of the term Tardenoisian is considered necessary by de Mortillet to represent the earliest evidences we have of actually Neolithic man, as distinguished from those later and more abundant evidences of his sojourn in the way of Megalithic monuments—cromlechs, dolmens, &c.

The Tardenoisians, according to the authority just named, were wandering hordes that had come from the east and had mingled with the last of the Magdalenians (or more probably the Azilians). Not settling down as agriculturists but leading, at least at first, a more or less nomadic life.

The relics of these early Neolithic people are fairly abundant throughout Europe, and are distinguished from those of the succeeding races by the absence of

polished implements. Pottery is found amongst the relics, but it is of a crude type.

When remains of the people themselves are found, it is seen that the skulls are almost invariably of the long form—*Dolicho-cephalic*, whilst those of their immediate successors are almost as invariably of the round form—*Brachy-cephalic*.

The long burial mounds known as “Long Barrows” as distinguished from the “Round Barrows,” “Dolmens,” etc., and which are so well represented throughout the British Isles no doubt mark the period when the descendants of these people had commenced to settle down, and to become blended with succeeding races. Thus we get the aphorism “Long Barrows—Long Skulls, Round Barrows—Round Skulls.”

ROBENHAUSIAN PERIOD.

(From *Robenhausen*, a hamlet in the Canton of Zurich).

This is the full Neolithic period abundantly represented by Megalithic structures throughout these lands.

The uniformity of the human type, so fairly constant in Paleolithic times, now, it appears gives place to much diversity, there having been immigrations into North-western Europe of various tribes from the East and probably from the South.*

Mr. G. Temple, in his *Drama of the Lake dwellers*,† (referring it is true but to the latest phase of the Neolithic period) thus graphically describes these men and their environment :

* Vide *la Prehistoire*, p. 665.

† *Progress* 1883.

“The land is shaggy with wood and morass, ages have passed since the last mammoth gave up the ghost and bequeathed his bones to a distant posterity as a memorial of a mighty race worsted in the fight with nature. Wild oxen, boars and elks make their lair in the bosky depths.

There wolves and bears compete with man for the prizes of the chase, while on the rivers the otters thrive unmolested and the beaver-dam is in its palmy days.

It is in such a world as this that Neolithic man appears to the imagination. A time in which single families inhabited caves in savage isolation, and struggled unaided with the fierce denizens of the forest for the means of life, must have been to him little better than a tradition. He is a member of a community, accustomed to take thought for the general maintenance and defence. He possesses flocks and herds, the horse is his servant and the dog his companion in the chase.

Patches of grain are ripening in the forest spaces, and with the practice of agriculture there has developed in him the genius of thrift and industry. Like the Celt of to-day, he adds the craft of fisherman to that of husbandman, or, familiarized with river-travelling, uses his fire-hollowed canoe to effect barter with neighbouring communities.

Spindle and distaff are plied by the women of the household, and bone needles are busy piecing together garments of skins.

His dwelling seems to have taken its form from local circumstances. In one place it is a species of

pit or hut circle, in another it is a log cabin, in yet another it is a crannoge or combined clay and wood structure erected on an islet."

De Mortillet, after giving much the same description of Neolithic man, touches the more seamy side, and says:

"With the domestication of animals, and agriculture, came war for the possession of the soil, and religion, entertained and exploited as a powerful means of domination, then appeared in Europe."*

Be this as it may, it is certain that in this period we find the first evidences of warfare, and skulls cracked by the battle axe become an appreciable element among the relics.

Barbed arrow tips and stone axes, symmetrical and often highly polished, are the characteristic implements of the Robenhausian period, but selected pebbles, simply bevelled at one edge, as used by the earlier Neolithic people, are still largely employed.

Pottery is now made of finer clay, and some articles bear the lines of the potter's wheel, and are ornamented with dots, lines, and chevrons.

Personal ornaments seem to be much in vogue, and beads, anklets, etc., are beautifully made from choice fragments of stone. But *sculpture* has for its highest standard coarse and horrible caricatures of the human form.

Immense labour is bestowed upon sepulture—or at least upon that of the notables—as the abundant

* *loc cit*, p. 665.

cromlechs, dolmens, etc., which these people have bequeathed to us amply testify.

Neolithic man appears to be a sun-worshipper. His burial chambers are directed towards the east, and symbolic signs on some of the late Neolithic dolmens of Brittany represent the sun in connection with barley sheaves—"The God and his Gifts."

Among the abundant human remains of this period, well set bones of broken limbs, and trepanned skulls, show that the surgeon's art was practised with considerable skill, and it is suggested that the little hoards of finely pointed pigmy flints we sometimes find, may represent the surgeon's set of operating implements.*

Together with the relics of the later portion of this period we begin to meet with articles made of bronze; then gradually this metal supersedes stone for weapons and industrial implements, and we pass from Neolithic times into the "Age of Bronze."

THE BRONZE AGE.

As just stated, this period dawns by slow degrees. Whilst with the latest Neolithic relics we begin to find axes, etc., of bronze, we also find numerous stone implements, the details of which clearly indicate their having been constructed on models of bronze ones, this suggesting that whilst the metal was known, it was not within the reach of all.

That the original bronze articles are not of local manufacture is indicated by their form and the designs upon them, which are decidedly Oriental.†

* See *British Medical Journal* July 26th, 1913. p. 157.

† See "Archæology," in *Encyclopædia Britannica*.

Later on we find abundant evidences of local bronze industry.—The sites of foundries, with moulds and masses of surplus metal which had been poured in hollows in the ground, broken up implements intended for the melting pot, etc.

Some authorities consider that the employment of copper preceded that of its alloy, but others say that of this there is not sufficient evidence.*

Then as bronze had slowly replaced stone for arms and industrial implements, so now bronze begins to give place to iron, and we enter the iron age and hail the dawn of history.

* *loc cit.*

CHAPTER III.

THE RISE AND PROGRESS OF ARCHAEOLOGICAL DISCOVERY.

THE story of the rise and progress of archaeology is an interesting one.

As far back as the 16th century we have records of the discovery of flint implements, which at that time were the source of much superstition. The arrow tips and other artificially pointed flints were “Elf darts,” and the more massive forms, such as the Neolithic axes, were “Thunderbolts,” beliefs which still hold with the more uncultured in most rural districts throughout Europe.

Certain scientists, however, soon came to the conclusion that these things were of human workmanship, and in 1797 John Frere referred to some that he had found in Suffolk “to a very remote period, even beyond that of the present world, and to a people who had not the use of metals.”

Professor Haddon, from whose work “*The History of Anthropology*” I quote the above, goes on to say:—

“The belief of the middle ages that everything inexplicable was the work of the Devil, was succeeded by an ascription of all objects of unknown antiquity to the Druids or the Romans; but to neither of these could be attributed the finds which were being made at the beginning of the 19th century in the Danish kitchen-middens and dolmens, in the Swiss lake-dwellings, and in the caves and gravels of England

and France. Still, many years were to pass and many heated discussions were to be held, before archaeology came to be recognized as an ally of anthropology, and prehistoric man obtained credence."

Of the various discoveries of flint implements in association with bones of extinct animals in river gravels and in caves, and of the controversies to which these gave rise, there is an abundant literature.

The most remarkable of these discoveries in England at least, was undoubtedly that of Kent's cavern in Devonshire, discoveries which commenced in 1824.

But in all these the opponents of the doctrine of man's high antiquity found ground for quibble. "Yes, the worked flints, the hearths and the burnt bones, were suggestive of man's handiwork, but where was man?"

The naturalists and other scientists of the time, with equal weight of authority on either side, were divided.

De Boot in 1636, and Peyere in 1655 had declared that such things indicated *man*. Cuvier opposed the doctrine and held that fossil man could not be, for although human bones had been found in deep strata, none had yet been found in uncontrovertible association with these relics.

Now the battle-field has shifted, the presence of man in even early quaternary times is accepted, and the question in dispute is the actuality of man's presence in *tertiary* times.

Of the discovery of the remains of Prehistoric man

himself, the first instance we have dates from 1700, when a skull was found at Cannstadt under conditions which must have suggested some scientific import, for it was placed in the museum at Stuttgart. There, however, it was left unstudied and unconsidered for 135 years.

In 1828, Tournal, the Curator of the museum at Narbonne, announced in the *Annales des Sciences Naturelles*, the discovery of human remains and fragments of pottery, associated with bones of animals some of which are now extinct. (This has of course simply reference to Neolithic times).

A little later the Belgian Professor Schmerling, discovered in a cave near Liège, human remains associated with those of the elephant and rhinoceros, and in 1833 published the result of his discoveries in a work entitled "*Recherches sur les ossements fossiles découverts dans les cavernes de la province de Liège.*"*

Prof. Haddon says : "That these announcements so subversive of all generally accepted notions as to the antiquity of man, met with violent opposition, may go without saying, but, as fresh evidence accumulated, opposition took the form of a conspiracy [of silence and for a while a certain apathy prevailed with regard to the whole question of man's antiquity."

"About the middle of last century however the question revived, old discoveries were reconsidered and their full significance recognised."

* See de Mortillet's *Le Préhistorique*.

Much impetus was soon after given to the science by further discoveries.

In 1856 a skull and other remains were discovered in a cave in the ravine of Neanderthal, on the right bank of the river Dussel, in Rhenish Prussia, which gave rise to much learned discussion, for the skull presented characters which differed considerably from the modern type.

Doubts were freely expressed by many scientists as to whether it was human. Virchow, the celebrated pathologist, was of opinion that it was human but was diseased. Huxley recognised the skull as human, but declared it to be the most ape-like ever discovered, and placed it below the Australian type, and nearly to the present day the classical "Neanderthal skull" was accepted as the most ancient relic of the human race ever discovered.

In 1886 two skulls and other human remains were found associated with those of the mammoth, woolly rhinoceros, cave bear, hyena, &c., in a cave at Spy, in the Namier district in Belgium. Five of the nine species of animals the bones of which were found with the human relics being now extinct.

In 1901, in an alluvial deposit at Trinil, in Java, Professor Dubois discovered what is apparently the remotest relic of humanity yet discovered, viz., a cranium and some associated bones and teeth. These, it is said, represent an individual almost too ape-like to be considered human, and yet too man-like for an ape.*

* See *Early Hunters*, by Prof. Sollas.

To this fossil the term "*Pithecanthropus*, or Manape" has been applied, and by some anthropologists it is held that the individual to whom the bones belonged is representative of the proto-humans who were the chippers of the Eolithic flints.

In 1907, a lower jaw, of remarkable form, was found in a sand pit at Mauer, near Heidelberg, which, although unassociated with other animal remains, occurred under such geological conditions as to afford some basis for chronology, a subject which will be discussed in a separate chapter. This "Heidelberg jaw," as it is now termed, seems to link *Pithecanthropus* with the now well-known Neanderthal type. But around these very ancient relics there is still much controversy and many points that call for more light.

On September 18th, 1911, Dr. Henri Martin discovered in a roadside cutting at *la Quina*, Charente, an almost complete skeleton of a Neanderthal man, together with flint implements of the Mousterian period.*

A notable discovery of recent years is the "Ipswich" skeleton, which is claimed by its discoverer and many other scientists as well, to be that of a Chellean or of an Acheulian man. The claim for such high antiquity being based on the geological deposit in which it was found, but whilst the argument from such data appears conclusive, some scientists raise objection to the claim on the grounds that these remains are of the same type as modern man, whereas most other

* Bulletin de la Société préhistorique de la France, Oct. 1911.

ancient human relics represent more or less the Neanderthaloid type, which has strongly marked simian characters.

Exactly the same arguments on each side apply to remains found at Galley Hill and described in 1895.

Touching this paradoxical point, Dr. Keith, writing in the *Bedrock* for October 1912, on recent discoveries of ancient man, says,—referring to Neanderthal man, “He appears for a period, and is then replaced by modern man. His transformation into modern man is refuted by both anatomical and archaeological evidence. We have therefore still to seek for the primitive and ancestral forms of modern man. The discoveries in England show that we must go a long way further back in the geological record than is usually believed, to find our ancestral form. At least in the middle of the Pleistocene period, long before the period of Neanderthal man of the Mousterian age in France, modern man had appeared in England.”

“It is therefore in the *Pliocene* formations we are most likely to meet with the early forms of modern man.”

For a concise account of the various discoveries connected with this subject, the reader will do well to consult some of the recent publications—as for instance, Professor Haddon’s *History of Anthropology*, Dr. Duckworth’s *Prehistoric Man*, Dr. Keith’s *Ancient types of man*, and Dr. R. R. Marett’s *Anthropology*, but he will do well to bear in mind the closing sentence of de Mortillet’s *Prehistoire*: “Mais le préhistorique est une science encore jeune, qui est loin d’avoir dit son dernier mot.”

CHAPTER IV.

PHYSICAL GEOLOGY OF THE CHANNEL ISLANDS.

THE reasons for the digression which forms the subject of this chapter will become evident further on, when we consider the changes which this part of Europe has undergone during the period of human occupation and the reason why certain of the Paleolithic races of man, and not the others, are represented in the islands.

The method by which the islands were originally separated from the Continent and from one another, and repeatedly re-connected and re-severed,—as well as the order in which these changes took place, appears to me not difficult matters to trace.

Glancing at the map of North-western France, we note that all the islands lie within the great bay of St. Michel—or, as it is better termed by French geographers, the “Golf Normanno-Breton,”—Guernsey being the outermost, and lying just within a line drawn from Cap la Hague to Ushant,—the Northern and Southern horns of the bay.

With the exception of the clays forming their superficial layers, the islands consist entirely of granites, diorites, gneiss, felsites, and (in Jersey) volcanic tuffs and archæan shale, the latter considerably hardened by contact metamorphism. The whole of these rocks then representing series which resist erosion in marked degree.

The rocks of the adjacent Continental coast consist of Devonian shales, sandstones, conglomerates and cretaceous deposits, with here and there,—e.g., at Cap Flammanville, Siouville, &c., outcrops of granitic rock.

From the heights above the town of Carteret it is easy to perceive that these Devonian shales, &c., must have once extended throughout the area of the great bay, and that the Channel Islands, like Cap Flammanville, &c., represent resistant cores once embedded in the more erosible formations.

The Devonian shales that surrounded the islands, except for some few fragments among the pebbles on the Jersey coast, have long since gone into mud, whilst the sandstone and limestone pebbles, so plentifully strewn around all the islands, are the remnants of the harder rocks. The numerous flint nodules around the shores indicate that chalk beds must also have occurred in the investing matrix.

Prior to the sculpturing of the islands the Seine, with innumerable tributaries, coursed where now is the English Channel, reaching the sea some eighty miles West of Guernsey, where the limit of the 100 fathom sounding line marks the border of the old Continental plateau, its course being well marked by the depression known as "Hurd deep."

As the work of erosion proceeded, Guernsey became revealed as a promontory on the new coast line. Then Guernsey and Herm, as one island, became cut off from the Continent.

As erosion of the soft investing rocks continued,

Sark and Alderney appeared, whilst Jersey, deeper inland, in the far recess of what is now the bay, remained continental for long ages after the insulation of its sister isles.

If we take up the Admiralty Chart we will note that besides "Hurd deep," there are other lines of deepened soundings which mark the course of ancient rivers, thus, along the North coast of Jersey, and between this and the groups of granitic islets known as the Dirouilles and Ecrehou reefs, we can trace the former course of the "Aye," which now reaches the sea at St. Germain sur Aye. To the South of Jersey, another line of deeper soundings marks the course of the "Sienne," which, now reaching the sea at Tourville, then coursed between Jersey and the extensive group of granitic rocks which form the Minquier reef. Then, turning to the North-west, past the Southern shore of Guernsey, the Sienne together with the Aye, reached the Seine at Hurd deep.

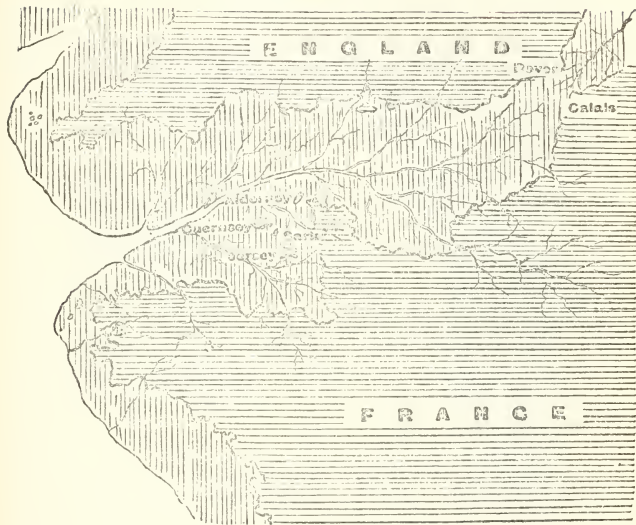
South of the Minquier reef, the Rance, joined by several smaller streams, flowed North-westward from the Côtes du Nord. *

We now perceive Guernsey, Alderney and Sark, as islands, and Ecrehou, Jersey, and the Minquier reef, as promontories stretching westward from the Norman coast.

From the higher portions of each isthmus—the "Bœufs" and the "Anquettes"—in the case of Jersey, and the Chausey islets and the "Ardennes" in the case of the Minquier reef,—lesser streams, running North

* See note on Submerged Valleys in addenda.

DIAGRAM A.



POSITION OF THE CHANNEL ISLANDS PRIOR TO THEIR SEPARATION
FROM THE CONTINENT AND FROM EACH OTHER.

The horizontally shaded portions show existing land ;
the vertically shaded ones, land removed by erosion.

This also shows the position of the islands on each
occasion that the land has been elevated to the extent of
300 feet,—as during the great forest period.

(For subsequent position of Jersey during erosion, and its
repeated position in the following land elevations and
subsidence, see diagram B.)

and South, joined the westward flowing rivers, and erosion creeping up each estuary, thus set free the members of the Channel Archipelago.*

Probably many oscillations of land took place during the long period occupied in this process, the channels extending inland during periods of subsidence, and deepening at their seaward ends during periods of elevation.

During the process of original erosion, and during a time when the land stood some sixty feet lower than it does at present, the high level caves such as "Cotte à la Chèvre" and "la Cotte" in Jersey, the "Creux Mahier" and several others in Guernsey, were excavated, whilst lines of raised beach (70 foot raised beach) now firmly consolidated in recesses of the cliffs, and traceable in the Valleys, mark the tide margin of those days.

The reason why these high level caves could not have been excavated at a subsequent period are too lengthy to introduce here, but I have elsewhere dealt with this part of the subject.†

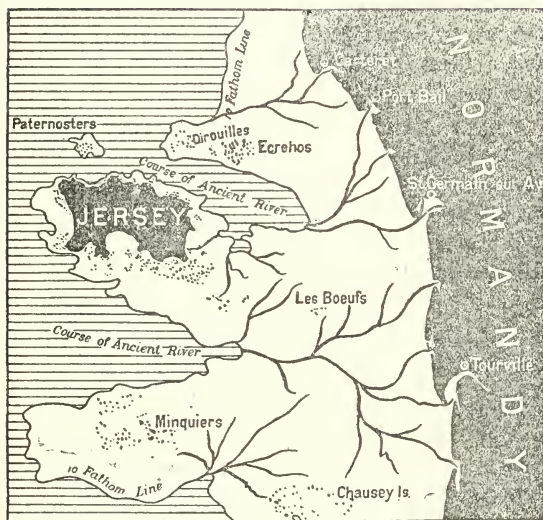
We next note land elevation, and the sea assailing the cliffs at about the same level as it does to-day.

It was no doubt at this period that the excavation of the numerous caves that tunnel the cliffs at present

* Of course the depressions marked on the chart also represent the course of each river in periods of subsequent land elevation, but the order holds good none the less, for the same channels—or the same with little deviation,—would always be re-occupied by each stream, as we can readily understand if we consider what would happen if the land were now risen say 200 or 300 feet.

† *Geology of Jersey.*

DIAGRAM B.



POSITION OF JERSEY WITH THE LAND 60 FEET HIGHER THAN
AT PRESENT.

(Contour of 10 fathom soundings).

This diagram explains the plan of the original separation of the Island from the Continent by erosion, and also shows the Continental position it has repeatedly held in the subsequent periods of land elevation and subsidence.

sea-margin was commenced, and the raised beach so well represented at Belcroute, Jersey, was deposited.

Land elevation must have continued until the islands were again rendered continental, and admitted respectively men of the Chellean and Acheulian races, and a fauna which would support those ancient hunters.

What period elapsed before another oscillation of the land occurred, or rather by what slow degrees the change took place, it is not possible to say, but there must have been sufficient time to witness a change from the warm climate of the Chellean, to the cold of the Mousterian times.

After the Mousterian period, or coincident with it, we note subsidence setting in, and now marine deposits intermingle with the rubble drift of glacial times.*

We now see the islands separate, and with a much smaller area than they have at present, as may be seen in the marine deposits that lie beneath the present-day soil of the lower lands and stretch into the valleys. †

Elevation followed, and the rubble drift and marine clays around the shores emerged and became clothed with vegetation, whilst gradually the islands re-united and again formed part of the Continent.

* As I mention elsewhere, some authorities—but by no means the majority—hold that during this glacial period, there was land elevation.

This may hold good for some localities, but in these islands at least, the torrential deposits of glacial times, and a *marine* deposit, are certainly in contact.

† See E & F in diagram C.

Very probably this elevation was so great as to render the British Islands Continental and to restore the Continental plateau to the margin marked by the 100 fathom line.*

A great forest gradually spread over this restored land area; that forest, relics of which are frequently exposed around our shores and which is traced by the dredge even in mid-channel:—The lower submerged post-glacial forest.

How long this forest period endured—that is, what interval elapsed between the periods when trees began to fringe the emerging lands, and the time when the sea had returned to its old domain and submerged even those portions of it which lie beneath our present-day soil, has never, I believe, been calculated, but, to allow such alternations of land elevation and subsidence, or even for the accumulation of compact forest remains, 14 feet in thickness, as is the case beneath some parts of St. Helier, the period must have been a very long one.

Subsidence again set in, the forest trees died under the influence of the approaching sea and decayed in situ, down to the bases of their trunks. Sand banks, as they were pressed landwards at the tide margin, intercepted the drainage of the land and gave rise to a zone of bogs in which bog-plants grew and enshrouded the old tree stumps, the story which we see repeated to-day along St. Ouen's Bay, where (except for temporary arrest by human intervention) the St. Ouen's pond, the *Mare du Sud*, and some lesser bogs and marshes are slowly creeping landwards.

* See Submerged Forest.

DIAGRAM C.



A—Recent alluvial soil, blown sand clay—
4ft. to 6ft

B—Upper peat bed—1ft. to 3ft.

C—Marine deposit of clay, stone, or shell—
2ft. to 5ft.

D—Lower peat and forest bed with oak, alder,
hazel, &c., and relics of Neolithic races
—5ft. to 14ft.

E—Marine formation—gravel, shells, sand and
clay—3ft. to 5ft.

F—Clay with stone fragments—(Rubble-drift
of glacial age)—6ft. to 8ft.

G—Firm clay—3ft. to 4ft.—(sometimes absent,
exposing rock in contact with **F**.)

SYNTHETIC SECTION OF SOIL BENEATH ST. HELIER.

Once more we note evidences of land elevation. Over the marine material which covered the forest remains, as the area again became dry land, vegetation appeared. This vegetation is represented by our "Upper peat bed," ("B" in diagram C.).

This elevation could not have been very considerable for no tree remains occur in the upper peat bed. The remains which occur are only of such plants as would grow on a flat and sandy shore. Still, as we can trace this peat bed extending beyond the limits of our lowest spring tides (as in St. Aubin's Bay) it is fairly certain that the land elevation was sufficient to render Jersey again Continental—at least as a peninsula—as shown in diagram B, and to re-connect Guernsey and Herm. Such connection would agree with the numerous legends and traditions we have of "Continental Jersey," for these could not by any possibility refer to the remote period of the "Age of great forests."

The next change we note is the very obvious one of recent subsidence. This *upper peat bed*, with the great forest remains five feet beneath it, is now, as I have just said, submerged even at our lowest spring tides.

(It must here be noted that the peat and forest bed, frequently exposed in St. Ouen's Bay, St. Clement's Bay, St. Brelade's Bay, Vazon Bay, &c., is not this *upper peat bed*, but the "*Great Forest*" bed, for the materials constituting the upper peat bed, and the marine gravel, &c., which intervenes between it and the "*Great forest bed*," are of loose texture and get

eroded and mingled with present day deposits, whilst the "Great forest bed" layer is firm and elastic, and thus resists erosion to a great degree. Near the harbour of St. Helier, and other portions of St. Aubin's Bay, such erosion however has not occurred, but the whole series of deposits has been submerged without disturbance).

Such then is an outline of the physical changes which these islands have undergone since, say mid-tertiary times.

The series of oscillations which they have undergone during the *human* period, are clearly shown in diagram C.

In some of our standard works on physical geology, where oscillations of land levels in the area of the British Isles are mentioned, it is stated that, after the subsidence which brought the great forest regions under water, there followed the land elevation which has brought the British islands to about their present configuration. Now, in the Channel Islands at least, this is not the case, for the islands owe their present configuration not to elevation but to *subsidence*, as is witnessed by the submergence of the upper peat bed, and also by the fact that the site of some buildings, of which there is historical record—e.g., a manor house in St. Ouen's Bay, "le Manoir de la Brequette,"*—is now covered at high tide by 6 or 7 feet of water.

* See *Bulletin de la Société Jersiaise*, 1883 & 1910.

CHAPTER V.

LOCAL EVIDENCES OF EARLY MAN.

PRE-CHELLEAN PERIOD.

PRESENTING good exposures on many parts of the Jersey coast and still better ones on the North-western coast of Guernsey is a raised beach composed of pebbles and shingle. In some places these materials are bound with ferruginous sand into a fairly firm conglomerate.

This beach stands at 25 feet above ordnance datum, and is probably contemporaneous with the 25ft. beaches represented all through North-western Europe.*

Unfortunately, in the Channel Islands no organic remains occur in this beach, for the granite and diorite pebbles of which it is mainly composed would have reduced to powder any shells that might have been present, so that there is no palaeontological evidence as to its age.

But there are other data to work upon. In one exposure, viz., in Belcroute Bay on the South-west of Jersey, there is a very fine vertical exposure of cliff which shows strata as follows. (See Plate I).

Resting in most places on bed rock, in others, on a ferruginous clay, is the raised beach. This varies in thickness from one to three feet. Above this is blown sand partly consolidated into an incipient

* See Geikie's *Great Ice Age*.

ferruginous sandstone. This deposit varies from a few inches to three feet in thickness.

Above this is yellow clay showing irregular lines of stratification and containing a large amount of angular stone fragments and some large granite boulders. This deposit is from six to eight feet in thickness.

On this, at one spot, is a conspicuous band of small angular stones without any admixture of clay, about a foot in thickness, clearly indicating the bed of a stream, and at the same level as this indication of a stream, there occur land and marsh shells, viz., *Succinea* sp., *Helix caperata*, *Helix hirsutus*, *Pupa* sp., &c., showing that this level marks an old land surface.*

Over this again comes clay, irregularly stratified, and containing stone fragments and boulders. This varies in thickness from 20 feet to 40 feet, and on it rests present day surface soil and vegetation.

We have therefore here clear indication of two glacial episodes overlying the raised beach in question—the well-known “Upper” and “Lower” boulder clays.

In, and just beneath the upper one, there occur relics of Mousterian times, and in, and beneath this deposit at St. Brelade, have been found remains of reindeer and woolly rhinoceros.

The upper boulder clay at this spot then represents glacial period IV, and the lower one glacial period

* Near St. Martin's Point in Guernsey, this horizon is still more clearly defined, and the shells of *Succinea*, &c., are very abundant.

III, so that the raised beach before us, antedating this lower boulder clay, cannot be of later date than mid-pleistocene, and is probably much older. In fact, there is good argument for assuming that it is much older, for, as it has been abundantly proved, Mousterian man lived in these areas in mid-pleistocene times, and we see that in the time of his sojourn these areas must have been Continental, the land probably extending to the limits shown in Prof. James Geikie's map of Europe at the close of the period of the Great Baltic glacier—which, with modification to suit local matters, is reproduced in diagram A, and a restricted insular region would not afford sustenance to the great mammals, the remains of which we find associated with Mousterian relics.

But when the raised beach was deposited, not only must these areas have been insular, but Jersey must have been of about one fifth, and Guernsey nearly of one third, less area than at present. Then between the beach period, and that of Mousterian man, there must have been very great land elevation, one of probably some two hundred or three hundred feet, and one glacial and one interglacial period must have elapsed. There would then seem good grounds for considering this raised beach early Pleistocene or even Pliocene.

Now from this beach I have obtained a considerable number of flints bearing every evidence of intentional chipping. They have been subjected to attrition among the pebbles of a shore and their "arêtes" are smoothed off, still the marks of successive chipping, all on one plan, and the bulbs and hollows of

percussion, are clearly defined. To the casual observer, they may appear ordinary accidentally chipped and smoothed pebbles, but to the practised eye they are much more.

I have shown these flints to several French Archaeologists, without saying whence they were obtained, to get opinions simply on their intrinsic merits, and they, in each case, were at once pronounced as human artefacts and "pre-Chellean." This is also the opinion of Mr. Reid Moir, who has a wide experience in the very early types of flint implements.

It must be noted that these were not selections from a number of flints in this deposit, they were the only ones occurring therein. There is therefore good presumptive evidence that we have in these some of the earliest evidences of human handicraft, certainly pre-Chellean, and possibly *Eolithic*.

At La Collette in Jersey, to the South of the hill on which Fort Regent stands, we have again deposits of boulder clay, the portion which is exposed above road level being the "upper" boulder clay. Here, owing to the construction of a sea wall and road, no line of distinction is now in evidence, but there can be no doubt that the portion which exists low down and stretches beneath the shore, some ten to twelve feet below high tide level, represents the lower boulder clay, the upper strata having here been eroded by the sea during present day and earlier periods of land subsidence. In this deposit, at its lower level, there again occur unmistakable flint implements. These are simply nodules, coarsely

chipped to a point at one end and flat at the other. In size they range from two to three inches in length, and weighing a couple of ounces, to six or seven inches in length, and weighing three or four pounds. The discovery of these in the first place is due to my son, but Capt. H. S. Lawson and other workers have found numerous examples.

Although so coarsely fashioned and representing the "prentice hand," these implements are fairly uniform in type.

Early Chellean is the latest date to which these can possibly be assigned, and they bear a striking likeness to the *Eoliths* in the British Museum.

How far this type is represented in the other islands it is not possible to say. In the Lukis Museum of Guernsey there are somewhat similar ones. Collected long ago, they are not accompanied with sufficient data, and even their geological horizon is not given.

A photograph of some of the specimens from La Collette which were collected by Capt. H. S. Lawson and my son, are shown in Plate II. These and many others from the same horizon in other parts of the island, are in the Museum of the *Société Jersiaise*.

ACHEULIAN PERIOD.

The Acheulian period seems to be less fully represented locally than the Chellean, or early Chellean, although implements of the former type are not infrequently met with. (See Plate III).

The specimens Nos. 1 and 3 here illustrated, which were found on the shore at St. Clement, No. 5

which was found in the masonry of an old house at St. Mary,* and Nos. 2 and 3 which were found on moorland at St. Ouen, are decidedly Acheulian.

To what extent these periods are represented in the other islands is not yet known, but among the many sporadic implements in the Guille-Allès and the Lukis Museums in Guernsey, which have been collected in Guernsey and Alderney, there are some of somewhat similar type.

Although, as raised beaches and inland marine deposits bear witness, the islands must have been detached from the Continent and from each other in earlier times, it is fairly certain that they were rejoined and Continental in the periods now before us, for insular and limited regions, even if they could have been reached by these primitive people, would not have afforded means of subsistence for races of simple hunters. This being so, we must expect to find similar relics equally distributed in each of the islands as search is continued.

MOUSTERIAN PERIOD.

Scattered and erratic as are the evidences of the occupation of the islands during the preceding periods, the case is far otherwise when the Mousterian is reached, for beyond the evidences of scattered implements on the moorland and in the clay, Jersey at least, has two important and well-defined Mousterian cave-dwellings, one of which has now

* In Jersey, as in many other parts of Europe, these "Thunderbolts" as they were thought to be (*Coups de Foudre*), when built into the walls of a house, were supposed to protect the structure against damage by lightning.

yielded to science, as already mentioned, not only an abundance of the implements of the period, with the hearths and the relics of the feasts of Mousterian man, but remains of man himself.

These two cave-dwellings, known respectively as "La Cotte à la Chèvre," St. Ouen, and "La Cotte," St. Brelade, and which I will now describe in detail, present some advantages over many more important ones, inasmuch as they are so situated that floods, which by washing in material from other localities, often cause confusion, could not at any time have had access to them. They moreover, bear clear evidence of one period of occupation only, free from admixture of types other than Mousterian. They are, what French Archaeologists term, "Pure Stations."

Unfortunately the soil in Jersey contains but a very small proportion of lime, and does not neutralize the carbonic acid brought down by rain, so that this acid acts upon bones that lie even at a considerable depth in the soil, causing in most cases complete decalcification.

Hence, among an enormous quantity of bone material in the caves, only a few portions have been obtained sound enough to admit of identification and preservation. Still, as we shall now see, sufficient material has been obtained to determine man and a Pleistocene fauna.

CAVE DWELLINGS.

LA COTTE À LA CHÈVRE, ST. OUEN.

(Plates IV and V).

This cave, the English rendering of the name of which is "The Goat's Hut," is situated on the North

of the island, about a quarter of a mile to the East of Grosnez Point. (See Map II). It is in the extremity of a little promontory with a deep and vertical gulley on each side.

The cliff, of which the promontory is an extension, is here 280 feet above the sea, but the promontory itself is but half that height. The cave runs parallel with the sides of the promontory, so that its opening faces the open sea, with direct Northern aspect.

The cave floor is about 60 feet above mean tide level, and the water just beneath,—that is, just beyond a line of boulders that have fallen from the cliff,—is 80 feet in depth at mean tide, so that the floor of the cave is 140 feet above the neighbouring sea-bottom; a point which it will be interesting to have in mind when we consider the aspect of the land at the time the cave was occupied.

The floor is thirty-four feet in length, and has a width varying from nine to fifteen feet, except at the extreme inner end, where it terminates in an obtuse point.

The roof is irregular, and ranges from ten to fifteen feet from the floor, being lowest near the cave opening.

The sides, like the roof, have irregular bosses, and more or less angular masses of rock intruding in some places for two or three feet.

The rock in which the cave is situated is, like that of the surrounding district, a fairly compact syenitic granite that withstands weathering in a marked degree, but in the cave roof are one or two portions of looser textured granite that are yielding to atmospheric influences and gradually decomposing into "brick-earth."

The floor of the cave is composed as follows, from surface downwards :—(1) Yellow, gritty clay or brick-earth, derived from the decomposition of the soft portions of the roof, from eighteen inches to two feet in thickness ; (2) A mixture of yellow clay or brick-earth and bone breccia of greyish-white tint and unctuous feel, about one foot in thickness ; (3) Whitish clay and small granite fragments, about six inches thick ; (4) Sea sand and pebbles, averaging from one to two feet, reaching down to the bed-rock.

Some large sea-worn granite boulders rest on the bed-rock, extend through the successive layers, and project from a few inches to a foot or so above the floor surface.

The history of these successive layers is not difficult to trace. Commencing at the bottom (No. 4); This sand and pebble marks the period when the cave was excavated by the sea, probably during the period when the island was being first sculptured from the Continent ; (3) Marks land elevation, with the sea no longer reaching the cave, but falling material from the decomposing roof beginning to accumulate ; (2) Period of occupation by man, for in this layer occur wood and bone ashes, flint implements and a large quantity of decalcified and disintegrated bone. It is decalcified bone and ash which gives to this layer its greyness, and the whiteness of No. 3 is due (as analysis shows) to the infiltration of limy material from the bone layer. That the surface layer (1) like that below the horizon of occupation (3) is entirely due to the slow decomposition of the roof is shown firstly, by the position of the cave, which is

such as to preclude admission of clay from any other source, and secondly, by the deposition of the same material on the projecting ledges in the sides of the cave.

As it was the discovery of the fact that this cave had been a dwelling in the remote past that originated Paleolithic research in the islands, it may not be without interest to state here how that occurred.

It was in 1861, that my friend Mr. S. Dancaſter and I, in scrambling among the cliffs, came quite accidentally upon this little cave. That it was little, if at all, frequented, was plain. The beautiful maritime fern *Asplenium marinum*, draped its far end and portions of its roof, and a thin growth of green algae (*Hæmatococcus*), carpeted its floor.

Whilst resting a little while within the cave, we noticed that where the rain had washed away some of the clay from near its opening, there were flint chips, which struck us as something unusual in a flintless island like ours. But like Peter Bell with his primrose, we took no lesson from them, and "Paleolithic man" was in those days a doubtful quantity. In fact, I do not think we had yet heard of him.

Twenty years later, when Paleolithic man began to claim general attention, these flint chippings came to my mind with startling significance. I mentioned this to Mr. Dancaſter and we resolved to explore the cave where we had seen them without delay.

Our first search resulted in the discovery of a very great quantity of flint chippings, indicating that this

cave had been an actual workshop. We found but few finished implements on that occasion, but on one side of the floor and two feet from the surface, we came upon a hearth of wood and bone ashes and some bits of carbonized wood. A lump of nodular iron pyrites, which had probably been used in conjunction with a flint, for striking fire, was among the ashes. The presence of bone was abundantly manifest all through the same layer as the hearth, but only in one spot did we find a portion in which form was retained, and this would not have been discernible except for the fact that in lifting a large flat stone, its form was revealed in the flat impress. This was half of the lower jaw of some large deer—probably *reindeer*, but even the teeth, which alone would furnish accurate determination, were in such condition that their details could not be ascertained.

Such was the first step in Paleolithic archaeology which was taken in these islands. Many subsequent examinations of this cave by ourselves and by various friends resulted in the discovery of further implements and a second hearth, but the presence of the large boulders already mentioned,—mostly irregular and undercut, rendered exploration difficult and unsatisfactory. It was only in 1912, when the *Société Jersiaise* undertook a systematic and thorough exploration that the sequence of the layers, as just described, and the fact that the cave was of marine origin, were made clear.

On this occasion about one hundred finished implements and a large quantity of chippings, were brought to light.

All the implements were of one type, a broad, cordiform variety of the "*Pointe Mousterienne*" a form which Mons. Comment refers to the earliest portion of the Mousterian period. (Plate VI).

The grey layer, representing the horizon of occupation, was found to consist, for nearly half of its mass, of disintegrated bone, but, as before, only small fragments, and totally undeterminable, could be obtained.

However, the fact then became clearly established that the cave showed but one period of occupation, an early Mousterian one, whilst the great quantity of flint chippings showed that it had not only been a dwelling place, but the scene of a busy industry,—a Paleolithic workshop.

LA COTTE, ST. BRELADE.

(Plates VII and VIII).

This cave, like the "*Cotte à la Chèvre*" at St. Ouen, is one of a series formed by the sea at a time when the land stood at a lower level than it does at present, and probably during the time when Jersey was being first sculptured from the Continent. It is situated on the South-western side of the island; in the Eastern horn of the Bay of St. Brelade.

At this part of the coast, the cliffs, which are of a coarse-grained syenitic granite, rise more or less vertically to an elevation of about 200 feet above mean tide level, and the shore at their base consists of flat granite rock, covered for the greater part with large boulders which have fallen from the cliffs.

In one part of this coast there is a gorge 40 feet in

width, which enters at right angles to the shore line for a distance of about 150 feet. This has vertical walls, exactly parallel with one another, and it is in one of these walls,—the one with a Southern aspect, and near the inner extension of the gorge, that the cave is situated.

The gorge, like the cave itself, was evidently formed by the removal by wave action of a dyke of granite which was of less resistant structure than that on either side of it, and in which the lines of cleavage were horizontal.

It is very probable that the cave once extended right across the gorge with its opening facing seaward, and that the portion which forms our present day cave is a lateral branch of the original.

The inner boundary of the gorge is now in the form of a steeply sloping talus, consisting of a mixture of yellow clay or brick-earth and angular masses of granite.

The cave itself, that is, the portion which still exists, was up to the time of its exploration completely filled with the same material as that which forms the talus, this filling being due to three causes, viz., a lateral spread of the talus, blocks fallen from the roof, and rubble which had access through an aperture, or "chimney" in the roof.

It would appear that even quite recently, in a geological sense, the gorge had been completely filled with rubble, and that it was through a sapping of the base of this mass, resulting in a downward slide, that the opening of the cave was revealed.

For what long ages the cave had been thus filled and sealed up, will be better understood when we consider the general geology of the island. Here it will suffice to say that the source whence this clay was derived is not now possible to trace, for the district for a mile or more around is flat, heather-clad moorland, without clay, and consists simply of granite, with a thin layer of soil resulting from the decomposition of its scant vegetation. Further, both the gorge and the cave are in a spur of cliff between which, and the actual table-land, there is a depression some thirty feet in depth.

The first intimation we have of this cave having been a human dwelling dates from about 1880, when Mr. S. Dancaster and the late Mr. T. Saunders, when studying the geology of the district, found a flint implement on the shore at the foot of the talus, and tracing its source, came upon a portion of the hearth which was exposed in section. Searching this, they found many flint chippings and some bits of bone. Various investigations of the section representing the hearth, by Dr. Chappuis, Mr. Colson, Capt. Rybot, and other members of the *Société Jersiaise*, resulted in the discovery of several implements and more bone fragments, but the loose condition of the superimposed mass of clay and boulder rendered this work so dangerous that it had to be discontinued.

In 1895 the *Société Jersiaise* employed workmen and commenced the work of clearing out the cave from the top. Owing to the threatening condition of the whole of the surroundings, it was found that a full exploration would entail an expenditure greater than

could then be incurred, so the work was postponed.

In September 1910, exploration was resumed, experienced quarrymen being engaged for the work.

After a few weeks' labour, sufficient of the rubble filling had been removed to lay bare a portion of the floor 11 feet square, to form a platform so as to afford footing on the outside, and to give some idea as to the extent of the cave.

The entrance, which is in the form of an irregular half arch, is 25 feet in height and 20 feet in width.

Just within the entrance, the roof slopes upwards into a rough dome, some 30 to 32 feet high. How far the cave extended rearward could not however be ascertained, for many hundreds of tons of the filling rubble still occupied that portion from floor to roof.

The floor proper was not clearly defined, for layers of black soil which proved to be a combination of ashes, carbonized wood and clay, were mixed up with whitish bone detritus, the whole forming a semi-solid breccia. Flint implements and flint chippings occurred plentifully all through these layers.

On the left of the entrance, and extending as far back as floor had been reached, was a hearth containing half a ton or so of wood and bone ashes, and among the ashes were many granite and felsite pebbles which bore signs of having been strongly heated, and which had probably been used for water boiling purposes, after the method of some savage races of the present day, who, in default of boiling vessels, drop heated stones into gourds of water.

Bone in abundance was scattered all around,

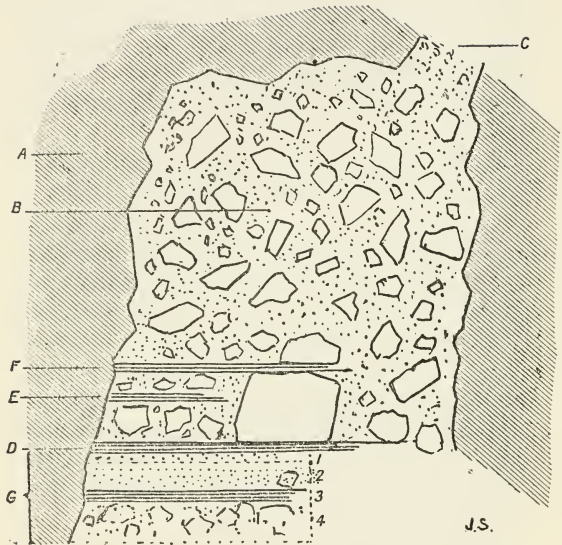


DIAGRAM I.

Synthetic vertical section of "La Cotte" and its contents at 11 feet from the entrance. (Parallel with entrance).

Scale 1 inch = 10 feet.

EXPLANATION OF DIAGRAM I.

- A. Granite Rock.
- B. Rubble of yellow clay and stone fragments, (now removed to 25 feet from entrance).
- C. Opening, apparently communicating with ground level above cave. (Choked with rubble).
- D. Main hearth, with abundant wood and bone ashes. Fragments of bone abundant, teeth of reindeer, woolly rhinoceros, bos, horse, and of small bovid (? *Capra antiqua*). Flint implements plentiful. Level of original occupation.
- E. Continuation of hearth over fallen rubble. Bone and teeth as above, *plus Human* teeth. Flint implements fairly numerous.
- F. Continuation of hearth over another fall of rubble. Bones and teeth of horse and bos plentiful. Bases of horns of a very large deer (? *Cervus elephas*) Molar of woolly rhinoceros. Flint implements scarce.
- G. Portion excavated beneath main floor level :
 - 1. Thin layer of yellow clay and a few stone fragments.
 - 2. Finely disintegrated granite, 1-ft. to 2 feet thick.
 - 3. Black layer, 1-ft. to 1-ft. 6-in. thick, composed of vegetal and animal remains, branches of elm with ivy attached. Fragment of fossilized bone (not determinable).
 - 4. Whitish unctuous clay and stone fragments.
(No signs of human occupation below D).

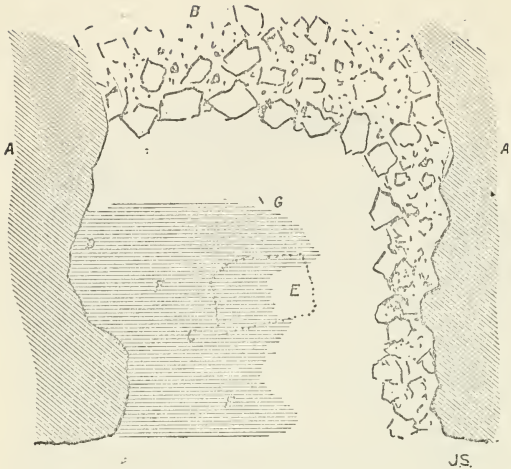


DIAGRAM II.

Plan of floor of "La Cotte" as explored up to Sept. 1911.

Scale 1 inch = 10 feet.

EXPLANATION OF DIAGRAM II.

- A A. Granite Rock.
- B. Rubble as yet unexplored—(backward extension probably twenty feet).
- C. Main hearth.
- D. Where bones and teeth were most plentiful. Human teeth at this spot, 3 feet above the level here shown. See Diagram I.
- E. Large block fallen on hearth, (now removed).
- F. Flint implements abundant.
- Upper F. Flint implements scarce.
- G. No flint implements found beyond this point.

forming cheesy, clayey deposits, offering no determinable portions.

Just behind the hearth, however, in a receding angle in the wall rock, a mass of bone offered some fairly coherent portions, as well as some teeth. These were carefully removed and packed in soft material, then infiltrated with gelatine and hardened.

These fragments were forwarded to Drs. Woodward and Andrews, of the British Museum, for identification and were shown to represent the following animals, viz.: woolly rhinoceros, reindeer, a large species and a small species of horse, some small bovid,—probably the primitive goat *Capra antiqua*, and the urus—*Bos primigenius*. (The teeth of this last were abundant). Portions of antlers as well as teeth of reindeer, and the horn cores of a small bovid were also among these.

Besides these animal remains, in the same recess were nine human teeth of unusual proportions. These were forwarded to Dr. Keith, of the Royal College of Surgeons' Museum, who recognised them at once as those of a Neanderthaloid man.

Of flint implements (all of one form, the typical Mousterian *Pointe à main*), about 200 were obtained, also many pebbles with abraded ends, which had apparently been used for pounding or triturating food material, also very likely as hammers for flint chipping.

At this stage the engineer in charge of the work considered that it would be prudent to postpone further clearing out of the rubble until some method of propping the now unsupported roof had been devised, so the work was suspended.

In 1911 exploration was resumed and a portion of floor 25 feet by 20 feet was laid bare. In the centre of the space thus cleared was a block of granite 8 feet in length and 5 feet in each other dimension, weighing approximately 14 tons. This block it was at first considered unnecessary to remove, but as the floor was being dug and examined, it was found that the hearth extended underneath it, whilst the presence of a layer of ashes, bone and flint chippings on the top, showed that this huge stone had fallen from the roof during the period that the cave was occupied. In fact, the lower, and original, hearth could be traced upwards in stages, showing that repeated falls of roof and rubble had taken place during the time of occupation.

These points, the diagrams will make clear.

The relics discovered in this resumed exploration were, with the addition of the bases of the antlers and portion of the skull of a large deer, the same as those previously found. At the spot where the nine human teeth had already been found, four others were now discovered, raising their total to thirteen. These, Dr. Keith pronounces as all belonging to one individual.*

How far the cave extends backwards was not ascertained, but judging from the slope of the roof, which at 30 feet from the entrance begins to lower, it is probable that some 50 feet is the full extent.

* These teeth form the subject of a monograph by Drs. Keith and Knowles, in which their similarity with those of Krapina and with those of the Heidelberg jaw is pointed out.

About another hundred flint implements were discovered at this stage.

On the opposite side of the gorge, facing the entrance of the cave and almost entirely concealed by the sloping talus which forms the termination of the gorge, was indication of another cave. This was investigated by Mr. G. F. B. De Gruchy, the proprietor of the site, and Mr. R. R. Marett, in 1912, and the result of their investigation communicated to the *Société Jersiaise*, of which Society both these gentlemen are members. It was then seen that this second cave was a branch of the first, that is, a large cave must at one time have existed in the site of what is now the gorge, and of which the two caves which are now facing one another, were lateral branches.

No hearth, or bones except in small fragments, occurred in this portion, but about a score of implements similar to those already described, were brought to light.

The exploration of *La Cotte* then, whilst it may be considered still incomplete, has proved highly interesting, as beyond the discovery of the remains of a man of the Mousterian period, it has furnished the first evidences of a Pleistocene fauna in the Channel Islands.

Apart from those found in these caves, unmistakable implements of Mousterian man occur in considerable numbers between the upper and lower boulder clays both in Jersey and Guernsey.

CHAPTER VI.

ABSENCE OF EVIDENCES OF THE LATER PALEOLITHIC RACES.

WITH the possible Eolithic, the Chellean, Acheulian, and Mousterian races, so well represented in the islands, one would naturally expect to find evidences of the immediately succeeding ones, the Aurignacean, Solutrian and Magdalenian, but such is not the case ; amongst the thousands of flint and other stone implements that are being constantly discovered in the clays and on the moorlands we seek in vain for the round-ended scrapers of the Aurignacians, the *feuille de laurier* of the Solutrians, the *pointe à cran* of the Magdalenians, the bone or horn harpoons, or evidences on cave wall, bone or slab, of the art of these people.

In the Channel Islands, a gap in succession here presents itself, and from the relics of the crude savage of the Mousterian period we pass at once to those of comparatively modern and civilized Neolithic man, so that as far as negative evidence is trustworthy, it would appear that the intermediate races were never in these islands.

One point here seems to me to be conclusive. Of the two caves just described, it is clear that Mousterian man was the last occupant. In the ‘Cotte’ of St. Brelade, where the hearths and relics were covered by 25 to 30 feet thick of rubble drift, and the cave thus completely filled in soon

after its abandonment, re-occupation would of course have been impossible, but with "La Cotte à la Chèvre," the case is otherwise. Here the Mousterian hearths and other relics were simply covered by the slow accumulation of clay formed from the decomposition of the roof, a few feet in thickness, the cave even at this day presenting ample and good accommodation for a cave-dwelling people. So this one would no doubt have been,—at least to some extent,—occupied by these later races, had they been here. Yet there is no sign of such occupation.

How then can such absence be accounted for?

Although there are counter opinions with regard to the physical aspects of these lands at the close of glacial times—some claiming that the land stood higher than it does now,—still, the majority of authorities hold that during the glacial period there was considerable land *subsidence*.

Now, whatever grounds there may be in other districts for contrary opinion, in Jersey at least, as I have already said, marine clay, shingle and shell gravel, overlie and intermingle with the unmistakable rubble drift of glacial times—transported clay, rock fragments and boulders,—thus showing that the Channel Islands were being rendered insular in those later glacial times.

We then see the reason why the late Paleolithic races are not represented locally. Mousterian man—as glacial conditions spread southward in increasing intensity—quitted these regions, following the reindeer away to the South, whilst, marking his exodus, came land subsidence.

Then, in later times, as climatic conditions improved, and when fresh races of men—the Aurignaceans, Solutrians and Magdalenians—spread northward, these regions were insular; little specks out at sea that offered no sustenance for large animals, and so presented no field for men who were dependent on the chase for their livelihood and who, most likely, had no means of transit, even had they wished to visit them.

In the Museum of the *Société Jersiaise* there are, it is true, two flint implements that bear a decided Aurignacean impress. One of these was found by my son among some Neolithic relics in a dolmen at St. Ouen. The other is without data, but it may well be that these are from some other locality, picked up and utilized by Neolithic man.

At all events, it is fairly clear that, after the Mousterian, there is no further local evidence of Paleolithic man.

CHAPTER VII.

EARLY NEOLITHIC (TARDENOISIEN) PERIOD.

WHETHER that early Neolithic period, described by de Mortillet as the “Tardenoisien” (from *Fère-en-Tardenois, Aisne*) is represented by the relics we find at a lower horizon than the usual dolmenic relics, is a question which cannot be said to be properly decided, but there are—in Jersey at least—abundant evidences of a race that appears distinct from the one we are so familiar with, as represented by our dolmens and other megalithic structures, a *dolicho-cephalic* people, in contradistinction to the *brachy-cephalic* dolmen builders, and amongst whose relics—although we find pottery—we do not find the characteristic shapely, and often polished, stone axes.

The Tardenoisians, de Mortillet says, were wandering hordes of barbarians that reached North-western Europe from the Caucasus, and were the first invaders of the territories just previously occupied by the Magdalenians.

De Mortillet’s “Tardenoisians” would then rather seem to correspond with the “Azilians” and “Tourassians” of other authorities, for the period, at least, coincides.

The Jersey relics, including as they do, groups of tombs, would scarcely indicate a truly nomadic race, but it may well be that they represent these people after they had commenced to settle down.

When excavations for building, or for other reasons, are made in the soil of St. Helier, when the peaty surface of the thick old forest bed is reached, polished stone implements and fragments of pottery, bearing the ornamentation of lines, dots, &c., we are so familiar with in the dolmens, are very often found. And such occur even deep in the soil, beneath the roots of trees.

But when we have passed right through this old forest layer—in some places as much as 14 feet thick—these relics cease. The same thing occurs when we dig into the soil of the submerged forest beyond the shore line in our bays.

This then shows that the upper layers of this forest bed are what we may term the geological horizon of the dolmen builders or “Robenhausians.”

In an excavation recently made for building in St. Helier (to be precise, in Halkett Place), when the forest layer was reached, numerous fragments of ornamental pottery and several of the well-known Neolithic flints were found, this, of course, at the horizon where Neolithic relics were to be expected. But after the forest layer—with stumps of oak and hazel—here eight feet thick, had been cut through, and the blue clay just overlying rubble drift of glacial age, was reached, numerous chipped flints, and several diorite and sandstone implements were found, and these, whilst all of Neolithic type, could scarcely be Robenhausian.

These relics, now in the Museum of the *Société Jersiaise*, are as follows:—

(1) One of those flat, selected pebbles, bevelled at

the widest end, that occur plentifully in kitchen middens, and that whilst apparently some of the earliest of Neolithic implements, persisted into the dolmen period, at which horizon they are found in small number, associated with the familiar polished stone axes ;

- (2) A flat diorite pebble, about 10 inches in length, 4 inches wide at its broadest end, and tapering to a point at the other. This seems to have served as an ordinary chopper, for its thinnest edge bears unmistakable evidences of some such use. It has, moreover, served as an anvil for chipping flints upon, for hollowed areas on its flat surfaces show the narrow grooves made by flint-flake edges ;
- (3) A block of sandstone, some three inches square, which also had been used as an anvil ;
- (4) A pebble with abraded ends, which had evidently been used as a hammer ;
- (5) An abundance of flint chippings.

When we consider that the trees constituting the forest bed layer at this spot, growing immediately upon the clay of glacial age, must represent the earliest vegetation that fringed the shores as the land emerged after the pre-forest subsidence, we at once see that the relics found at this horizon must be of much greater antiquity than those on the surface.

With the actual site of their origin before us, and with the geological conditions so well expressed in the strata, we cannot but ascribe these relics to the very earliest portion of the Neolithic age ; close upon

—if not actually —the transition or “Palco-neolithic” period.

Within the soil of a little grass covered islet off the South coast of Jersey, there are two distinct horizons of Neolithic occupation, and the lower of these also appears to belong to this Tardonisien period.

To understand the grounds on which these opinions are based, we must first consider the geology of that district.

“La Motte,” or as it is more popularly termed “Green Island,” is a little islet in St. Clement’s Bay.

It stands at about 300 yards from the shore and is accessible on foot at half tide.

It is about 100 yards in length, and varies in width, from 10 to 50 yards, and rises about 30 feet above high tide level.

The base of the islet is the diorite rock of this part of the coast, and upon this, for a thickness of about 15 feet, there lies yellow clay or “brick-earth.”

This deposit is stratified, and contains small stone fragments and some few large boulders scattered throughout its thickness. This stratification, and inclusion of stone fragments and boulders, shows that both clay and stone were washed to their present site by floods when the islet was part of the adjacent land, and thus evidently represents the “rubble-drift” of glacial times.

The adjacent shore, for a radius of about a mile, stands at a level some five feet lower than the summit of the islet, showing that erosion by rainwash—or, perhaps, more probably by the sea during a period of

submergence, has lowered the area, whilst the islet, flanked by rock and thus protected, has retained its original elevation.

That "La Motte" has more than once been insulated is witnessed as follows:—Firstly, in the lower portions of the adjacent shore, ten feet below present surface, there lie sea sand and gravel, and the familiar blue sea-deposited clay; this marking a period when the islet must have stood detached.

Secondly, on the sea-sand, clay, &c., just mentioned, both inland and between the islet and the shore, as well as on the islet's seaward sides, there is a layer of firm black peat with abundant remains of forest vegetation, this being a portion of the familiar post-glacial submerged forest of our shores, so that in the "great forest period," La Motte was a raised portion of the general land.

Thirdly, as is shown abundantly on all sides, subsidence followed the great forest period, and the sea covered the lower lands and crept up into the valleys, so that again La Motte was insular. Elevation followed, and the vegetation which now forms our "upper peat bed" grew on the marine deposits. La Motte was then, once more, a part of the general land.

Finally, present day subsidence, coupled with the erosion of the loose deposits which overlaid the firm peaty forest bed, rendered it insular.

That, throughout these vicissitudes in its history, the islet was of considerably greater area than at present, is of course obvious, for in each period of

subsidence its shores have been attacked, if not by actual wave action, at least by strongly impelled sea-spray, whilst rains and general sub-aerial agencies have done their share. Even during the last forty years or so, in which I have been in intimate touch with the locality, it has suffered considerable diminution of area.

When storms from the South-west accompany high spring-tides, the spray attacks the base of the stratified clay deposit, with the result that, sapped to some extent at its base, masses of the clay slip down, exposing clean cut and vertical sections of all the strata. Thus, on quite half of its circumference, the sides of the islet are vertical and allow good study.

Over the compact, stratified clay or brick-earth, there lies about 4 feet thick of fine textured clay or löess, mingled to some extent with sand; this deposit is apparently due to aeolian agency.

Above this comes blown sand, clothed with maritime vegetation, this marking the time when the islet was last connected with the shore, and formed part of the sand-dune covered area of the coast.

This digression, which I fear may have been a little tedious, brings us to our subject.

Below the vegetable soil and blown sand deposit, and upon the surface of the fine löess, are abundant evidences of Neolithic occupation. In fact this horizon may be termed a kitchen-midden.

Charcoal, bones of ox, pig, red deer, and abundant shells of limpets, form a conspicuous layer. Here also occur fragments of pottery—some of fine

texture, and ornamented with chevrons, dots and lines.

The usual flat pebbles, bevelled at their broadest end, so frequent among Neolithic relics are also numerous, and flint chippings occur plentifully.

Although no polished or well-made axes or carefully wrought flints, have so far been traced, it is still evident that we have here evidences of the same race of men as those who constructed the cromlechs and dolmens of these islands. Note must be taken of the fact that, at this horizon, the abundant bones are in firm and coherent condition.

The occurrence of shells of coast snails—*Helix virgata*, *Helix pisana*, and *Bulimus acutus*, mingled with the relics, as well as the limpet shells, show that when this horizon was occupied, the sea was not very far away.*

Beneath this zone of human relics is, as we have seen, the deposit of fine löess. This deposit, except at its margins where wind and rain have reduced it, is nowhere less than 4 feet thick, and must have accumulated slowly, but throughout its thickness there is no sign of human or other occupation.

Passing through this deposit we reach the surface of the firm stratified clay, and it is at this horizon that occur those evidences of that early Neolithic race with which we are for the moment concerned.

In May, 1911, after a landslide due to a storm, my son noticed in a vertical section, at the surface of the

* This, of course, was not the period of present sea proximity, but of the time when the sea *first* submerged the great surrounding forest land. See chapter dealing with local evidences of land elevation and subsidence.

firm clay, what appeared to be sections of two small stone chambers in line with one another, on opposite sides of a little promontory which was about 11 feet across.

One of these structures was facing East, the other West. A layer of stones—like a rough paving—occurred at the same level (Plate XI).

The attention of the *Société Jersiaise* was called to this discovery, and exploration of the site was commenced at once.*

The little structures, which had been revealed in section, proved to be two stone tombs placed end to end, and as excavation was continued, thirteen others were discovered.

One of these tombs was about 6 feet in length and some 18 inches in width and depth, but the majority were about 4 feet long and 16 inches in each other dimension, whilst one was evidently that of an infant, being but 16 inches long and 9 inches in width and depth. (Plate XII).

All were constructed on one plan. Irregular blocks of stone were so placed on the ground surface that their flattest sides—or ends, as the case might be—were inwards, giving symmetry to the interior of the tomb, and these were roofed over by other blocks of stone with their flat sides downwards, and with other stones piled on these.

As the tombs were brought to light and their capstones removed, it was found that they were compactly

* When the proprietor of the site was approached for permission to explore, this gentleman—Judge Gervaise Le Gros generously made a deed of gift, presenting the islet itself to the Society.

filled with the yellow clay or "löss," of their site, which must have been washed in by rains through the abundant crevices between the stones. So complete had been this infiltration of clay that the few long bones which were obtained were filled with it, and even some snail shells that had been washed in, were thus filled into their innermost whorls.

In most of the tombs decalcification of the bones had been so complete that not a trace, beyond some whitish lines of infiltration into the underlying clay, could be seen. Still, by the exercise of great care, three skulls, a number of teeth, and a few long bones, were obtained in such condition as to admit of preservation.

The three skulls, which are now in the Museum of the *Société Jersiaise*, and one of which is shown in Plate XIII, are all *dolichocephalic*, their cephalic indices being 69, 70 and 72 respectively. Or, in plainer terms, their breadth stands as 69, 70 and 72 per cent. of their length.

On the same level as these tombs, that is, standing immediately on the surface of the firm stratified clay, was a cairn or mound of angular stones, ninety feet in length, about 20 feet in width, and some 5 to 6 feet high at its summit.

This was examined by trenching through it at right angles down to the clay on which it rested.

It was then seen that it was not a "barrow," or a "tumulus," covering any structure—such as the tumuli which cover dolmens—but was simply a mass of stone which by degrees had been placed on bodies

deposited on the ground surface, the cairn being extended in area as bodies accumulated.

At the lower level of this mound, and permeating the clay beneath, were white lines of carbonate of lime,—the recrystallisation, as carbonate, of the dissolved phosphate of lime of the bones.

To what extent, and for how long a time had this process been carried on, is shown by the fact that down to ten or twelve feet beneath,—in the stratified clay,—the lime from the bones has formed abundant masses of those concretions termed *lössmannschen*.

Besides many crudely chipped flints without distinctive character, and one pebble implement, there were in the tombs some fragments of very rough pottery. These fragments were of so crude and ill-made a kind that they could be crushed with the fingers.

We thus see by the presence of pottery that the period of these relics was certainly Neolithic, but, as I think we shall now clearly see, a very early phase of that period.

The grounds on which I base my claim for the great antiquity of the relics of the lower horizon are :

Firstly, the condition of the bone. In the upper, and ordinary Neolithic horizon, we find the bones, as in most dolmenic burials, fairly sound. In the lower horizon, they have not only decalcified, but sufficient time has elapsed since they were laid there, to allow their lime to infiltrate the underlying strata and there to form new combinations—the *lössmannschen*.

Secondly, whilst the sea was within reach of the people of the upper horizon, so that they could obtain

limpets, and that coast snails occur among these relics, at the lower horizon there are no marine shells and the snail shells that occur around the tombs are those of woodland species—*Helix nemoralis*, *Helix hortensis* and *Helix aspersa*.

Again, as on a low and flat shore, sand is blown inland for long distances—some miles where there are no hills to arrest its spread—no sand had reached this spot at the time the tombs were erected.

The few fragments of pottery at the tomb horizon are not of the kind we find among the general and widely diffused Neolithic relics. Everything then points to the lapse of an immense period between these two horizons, and although the lower may not actually be among the first evidences there are of Neolithic man—of the wandering hordes of “Tardenoisians”—yet they may well be relics of these people when they began to become sedentary.

It has been urged by some local archaeologists that this mode of burial—stone tombs—is suggestive of a more recent race, but there is evidence of the same method of tomb construction even in the more remote Magdalenian period.*

It is possible that there may be other local evidences of these early Neolithic races, for instance, the relics found in a roadside cutting at Petit Port, in Jersey, in clay near Fort George, in Guernsey, and in many other localities, may well belong to such races, for amongst these abundant relics in the way of crude pottery, pebble implements and roughly made flint

* See Sollas's *Ancient Hunters*, under “Cro-Magnon.”

ones, not one of the characteristic stone axes of the full Neolithic period has been discovered.

Still the two instances I have dwelt upon—the relics beneath the forest remains in St. Helier, and the La Motte burials—are, I think, sufficient to establish the fact that those races once occupied these lands.

There is in the Museum of the *Société Jersiaise* a human cranium which was discovered in 1861 by two local archaeologists—the late Rev. R. Bellis and the late Mr. Charles Bott—as they were digging for flint implements in a vertical exposure of clay at “La Motte.” (Plate XIV).

By its position, a level some eight or ten feet still lower than the lower horizon of Neolithic occupation, and by the fact that the strata above and around were apparently undisturbed, it was assumed by myself and others that it must date from Paleolithic times.

No other bones occurred with it, and this fact, coupled with that of undisturbed strata, shows that it is not from an interment.

If it is of later than palæolithic date, then its presence at this level can only be accounted for by the possibility of there having been a vertical slip of the whole of the strata at that part of the little island—a “faulting” as this movement is termed in geology—due to the sea having undermined the bank.

Dr. Keith has made a careful examination of this relic, and says; “The cranium is undoubtedly that of a woman, and from the open state of the sutures one may infer that she was between 30 and 40 years of age at death.

“The cranium possesses highly evolved characters and has no resemblance to Neanderthal crania.

“It belongs to that type of skull with which we are familiar in late Palæolithic and early Neolithic European races. It belongs to the “river-bed” type; the Tilbury skull is its male counterpart.”*

I chanced to be present when the discovery of this skull was made, and remembering its horizon and the undisturbed condition of the surrounding strata, I have, until quite recently, been of opinion that it must be Paleolithic, the possibility of there having been a vertical drop of the strata at this spot not having until now occurred to me. It is therefore very possible that it belongs to the same race as that represented so fully at the level some feet higher, viz., to represent a member of the early Neolithic or “Tardenoisien” race, the skulls found at the latter horizon showing the same characters.

* Report on human crania in the Museum of the *Société Jersiaise*, by Arthur Keith, Conservator of Museum, Royal College of Surgeons, England.—Bulletin of the *Société Jersiaise* for 1912.

CHAPTER VIII.

THE LATER NEOLITHIC (ROBENHAUSIAN) PERIOD.

THE relics of this period, Dolmens, Cromlechs, Menhirs, etc., are abundant in all the islands except Sark, where, if such have existed, no trace now remains.

Poingdestre, the Jersey historian, states that in his time (1609-1691) there were in Jersey no less than 70 dolmens, whilst Guernsey, Herm and Alderney have either the remains, or authentic records, of some 40 more. A study of the numerous and unnecessarily massive unhewn pillars forming gateways to fields throughout the islands, and especially in Jersey, shows what has become of many of them.

When we consider that these ponderous sepulchral structures could not possibly have been erected for the disposal of the bodies of the rank and file, but in all probability only for those of magnates, we cannot but infer that the local Neolithic population must have been very considerable.

Of dolmens, or of composite structures embracing dolmens, all that remain in the islands are approximately as follows.

In Jersey, either intact or in fair preservation, nine. In Guernsey, five; and in Herm, four or five.

Of these, the best preserved are those of l'Ancrese and l'Erée, in Guernsey, and of Faldouet, Mont

Cochon, Hougue Boëte, le Couperon, and Mont Grantez in Jersey. (See Maps II & III and Plates XV & XVI).

As descriptions of these structures have been already published, *e.g.*, by Capt. Oliver, Mr. Lukis and others in *Archæologia* and in other journals, and full descriptions of the Jersey ones occur in the *Bulletins* of the *Société Jersiaise*, and of those of Guernsey in the proceedings of the Guernsey Society of Natural Science and local research, it is not necessary to dwell upon them here further than to point out where some of them may afford some clue as to the period of their erection, a matter which has hitherto been neglected. There is also another matter which has failed to receive attention and this is one of the several which may help us to arrive at some conclusion with regard to their date. This refers to the dolmens and menhirs that lie amidst the remains of the submerged forest off our shores.

At Herm, near "la Rosière," covered at high tide by twenty feet of water, there is one which I believe has been recorded, but without further note, whilst, at a distance of about half a mile from this, there is a mass of huge stones—not outcrops of rock, but piled stones—known as the "Vermerette Rock," which bears strong evidence of being the ruins of another.

At La Rocque point in Jersey, covered by some twenty feet of water at high tide, there is a block of the hard conglomerate—or rather, volcanic agglomerate—of St. Catherine's. This is rectangular in form, rather flat, and about 15 tons in weight. It lies just over five miles from the spot whence it must

have been derived, and no other portions of the same stone occur in its vicinity.*

This peculiar block, by reason of its form and its locality, has long puzzled local geologists, and no adequate theory to account for its presence has hitherto been propounded. It however appears very evident from its shape and size, as well as by its position—on a slight elevation of an otherwise flat shore, and with remains of submerged forest around it—that it is the capstone of a dolmen; whilst amongst the large blocks of granite scattered around, it is not difficult to trace its once supporting pillars.

In St. Brelade's Bay—or that division of the bay known as *le Ouaisné*, at half tide margin there are five blocks of granite set upright, with their bases in the peaty soil of submerged forest. These also bear strong indication of being the ruins of a dolmen.

Of other Neolithic relics beyond the present shore line, are two fallen Menhirs. One of these, a block of fine grained granite about 12 feet long and 3 feet in diameter, lies in proximity to a large fallen oak on the peaty soil of the forest bed 240 yards due South of the Dicq rock at Grève d'Azette in Jersey. The rock of this vicinity is diorite.

The other, 18 feet in length, 9 feet by 6 feet in diameter at the base, and tapering to a point, lies on a bed of gravel, about 100 yards from the shore line at Le Hocq, in Jersey. In proximity to the first named, in the peaty soil, there occur abundant flint

* The dolmen of "le Couperon" is constructed entirely of the same kind of stone as this block.

chippings, and quite recently my daughter-in-law has found at the same spot an elaborately finished and polished miniature flint axe, similar to those occurring at Morbihan, in Brittany.

During 1912 and 1913 no less than three previously unexplored dolmens were opened in the islands.

Within the grounds of the Manor of La Hougue Boëte, or more correctly the Manoir de St.-Jean, in Jersey, a large mound termed "la Tête du Fief" had long been suspected to be a tumulus enclosing a dolmen, but it was only in 1912 that investigation was made, this being carried out by the present proprietor of the Manor, Mr. A. Raworth, Seigneur de St. Jean.

By means of a tunnel opened on the South-eastern side of the mound, a chamber, some six feet square at the floor, and five feet in height, was reached. Within this were the remains of an interment, and abundant teeth of horse, fragments of pottery and numerous flint chippings.

It was evident that this chamber had never been explored, but decalcification of bone had been so great that little could be gathered as to the mode of interment.

Efforts have been made to show that the chamber had enclosed a "warrior and his horse,"* but there appears to me nothing to justify this assumption. There were teeth, not of one, but of several horses, suggesting that horses' heads, as customary food offerings to the dead, had been placed with the burial.

* Dr. Deyrolle and Capt Mauger, in *Bulletins and Mémoires de la Société d'Anthropologie de Paris*, May, 1912, p. 165.

Only the interior of this dolmen has so far been revealed, but it appears to be one of the most massive in the Channel Islands, the blocks of granite forming sides and roof being of exceptionally large dimensions.

In September 1912, the *Société Jersiaise* undertook the exploration of a dolmen at St. Ouen which, although it had been previously recorded, had certainly never been thoroughly examined.*

This structure, known as "*le Dolmen des Monts Grantez*," stands on the tableland, near the brow of one of the hills overlooking St. Ouen's Bay.

It stands 212 feet above sea level and about half a mile from the coast line.

This is of the form which is chiefly represented in the islands, viz., a large chamber with a covered avenue of approach, but with the addition of a large side chamber. (Plate XVI).

Within this dolmen there were eight interments, as shown on the plan which follows.†

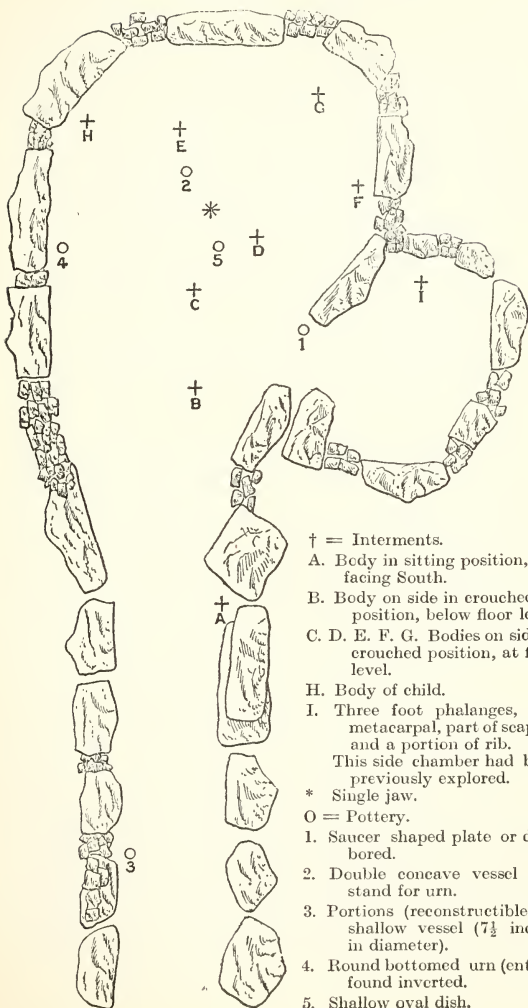
In September 1912, some megalithic remains of remarkable structure were discovered at l'Islet, in Guernsey. These consist of a covered chamber—a dolmen proper—surrounded by an irregular circle of stones, and on the outside of this, three smaller circles, two of which enclose rectangular tombs. There were no remains of interments, nor, beyond an entire urn and some pottery and flint fragments, any other relics.

* Lukis's *Manuscripts*, Guernsey.

† Photographs, and full details of this dolmen, appear in the Bulletin of the *Société Jersiaise* for 1913.

GRANTEZ DOLMEN.

PLAN OF FLOOR AND INDEX TO RELICS.



It was very evident from the undisturbed strata about the structure that it had never been interfered with by human agency, but the presence of sea-gravel amongst the stones strongly supports the theory advanced by Mr. Collenette, that it was reached by the tide margin during the subsidence which followed the great forest period.

This, and several other geological details, will render good assistance when we come to consider the chronology of our dolmens.*

Among other relics of the Robenhausian period are some that show that, however far back this period reaches, Neolithic man was still here in the bronze age.

The hammer head shown in Plate XVIII is clearly a reproduction in stone of a bronze original, and this applies still more strikingly to some large picks found in Guernsey, and now in the Lukis Museum.

Querns, and fragments of Querns—as are termed large flat stones for grinding grain, with the surface hollowed by use,—are fairly frequent amongst our Neolithic relics.

Some large oval pebbles, with holes bored through them, of which several have been found in Jersey, are almost certainly milling stones for use with the quern. (See plate XIX).

Such perforated pebbles are figured in various works on Archaeology, and termed “hammer stones,” but a moment’s study of them will show that they could scarcely have been used as hammers.

* Photographs, and full details of this dolmen, are given in the *Journal of the Guernsey Society of Natural Science* and local research for 1913.

Those here figured are of coarse grained, loose-textured granite, which would certainly shatter on impact, even with timber, whilst if for use as battle mauls, their weight and awkwardness would certainly handicap the wielder very considerably, and place him at the mercy of a more lightly equipped opponent. Then the holes bored through them would be preposterously large for hafts.

The suggestion that these are milling stones has not hitherto—to my knowledge—been advanced, but this is my conviction, and I do not hesitate to assert that such is the purpose for which they were intended.

With one of these, and a quern, as shown in the photograph, I have ground a quarter of a pound of barley to very passable flour within five minutes. The grain being placed in the hole of the milling stone, assures that each portion will be exposed to grinding action without being pushed about needlessly, as is the case when the same operation is performed with the ordinary solid pebble or “Muller.” Thus they are the prototype of the modern perforated upper millstone.*

Among other Neolithic relics found in the islands, (in Jersey) is the massive axe shown in Plate XVIII. This is of fine grained dolerite or basalt. Similar forms have been found in Normandy, whilst in the Lukis Museum in Guernsey are two specimens of not only the same shape and size, but of the same stone,

* Since this was written, Capt. Rybot, 76th Punjabis, informs me that he has seen similar stones thus employed among the hill tribes of Northern India.

which were found in North America, near the Hudson River.

Like requirements bring about like inventions, it is true, but in this case the similarity between the American and the local specimens seems too great to be thus explained, and gives rise to the question,—were the people of the two Continents in touch in those far back times? A question which must wait for answer until we have more light on the migrations of the Neolithic races.

CHAPTER IX.

THE BRONZE AGE.

THIS is represented in all the islands, the relics consisting of the familiar socketed axe-heads, swords, spears, knives and daggers.

These relics are to some extent sporadic, but the principal finds have been on the sites of foundries where broken implements intended for the melting pot occurred together with masses of surplus metal which had been poured in saucer-shaped hollows in the soil. Alderney appears to have furnished the most of these relics, but Jersey and Guernsey have furnished numerous examples.

The most important local relic of this period is a gold torque. This was found in 1889 some three feet below the surface of the sandy soil on the Western side of St. Helier, in Jersey.

This beautiful relic, which is now in the Museum of the *Société Jersiaise*, is of pure gold. It is 56 inches in length and weighs 24 ounces Troy. (See Plate XX).

By its length, and the hooks at each end, it seems to have been worn sash-like from one shoulder to the hip on the opposite side, for the suspension of a sword or rapier.

This Torque is pronounced by experts to belong to the middle of the bronze period, and to be most probably of Irish origin.*

* See Monograph on Torques, by E. T. Nicolle. *Société Jersiaise*.

A furnace, about 4 feet in length, and 18 inches in width and in depth, discovered by Mr. Collenette at St. Saviour's, in Guernsey, and which it has been suggested was either a crematorium or a pottery kiln, very possibly belongs to the bronze period. It was carefully constructed, and lined with flat rectangular bricks backed with clay. Numerous masses of baked clay, roughly shaped by squeezing in the hand and thus bearing finger prints, occurred in and around the furnace. These may have been for supporting pottery during baking.

This interesting structure, standing on a cliff which was being exploited for building, had to be demolished, but a careful plan of it, and examples of the lining bricks and clay supports, are in the Guille-Allès Museum in Guernsey. It appears that this is the second furnace of the kind discovered in Guernsey, but of the first, no record—beyond the preservation of some of the lining bricks—was made. There is no record of any other structure of the kind in the islands.

In 1903, during excavations for fortifications in Alderney, three adult human skeletons were unearthed. These may be either of this period or of the Gallo-Roman. Around the neck of each was a ring of bronze, the metal being circular in section and six millimetres thick. These rings bear no sign of a joint, but appear to have been either hammered out to their form or so welded as to leave no mark. A remarkable feature is that these rings, or collars, cannot be passed over the skull, and so must have been worn continuously from the time of infancy,

which suggests that they were badges of servitude rather than personal ornament.

The whole of these relics, which are well preserved, are now in the Guille-Allès Museum.

Of the subsequent periods, Early Iron, etc., the islands have but meagre record. A few urns and fragments of pottery and various coins in the local museums, being the only relics yet discovered.

CHAPTER X.

THE CHRONOLOGY OF LOCAL PREHISTORIC RELICS.

TO the ever-recurring question: "How long is it since the people who have bequeathed to us these relics lived?" no answer, intelligible to the ordinary mind, has, it seems to me, yet been given. With regard to the very early races of man, men of science, with few exceptions, have followed a policy of non-committal, whilst, with regard to the later ones, too much stress has been placed upon the relics themselves and not sufficient attention given to the evidences of the geological changes that have taken place since the relics were deposited. Thus, an urn of a certain pattern is found in a dolmen, whilst one of similar pattern is said to have been found associated with some bronze implements. Then the conclusion has been that the dolmen must date from the bronze period.

How utterly unreliable is this line of argument I think I shall be able to show from actual fact a little further on.

Let us commence with the dolmen period, and work backwards into time.

The age of the dolmens especially, has been a subject of enquiry ever since interest in Archaeology began, and very varied have been the replies to the query: How old are they?

Gradually and timorously their era has been placed back and back until as much as 8,000 or 9,000 years

has been ventured, but it seems to me from local geological evidences that these figures could be doubled or trebled with safety.

It has been urged that in one of them, the "du Tus" dolmen in Guernsey, articles of bronze were found; also, that in several of them there are evidences of cremation,—cremation being a practice which was common in the bronze period.

Unfortunately it has not been placed on record whether the bronze relics of the "du Tus" dolmen were found in association with an interment or simply within the precincts of the dolmen. In the latter case they afford no evidence of the age of the dolmen, for it is possible to find relics of quite recent years within the surface soil in such dolmens as may have been disturbed. In fact, a coin of Henry III. was found by the *Société Jersiaise* during the exploration of a dolmen at "La Hougue," in Jersey, at a depth of four feet from the surface! It is, however, certain that there is no instance of bronze in any other of the local dolmens.*

Several local dolmens are however so situated that geology affords us some assistance in arriving at an approximation of their date; for instance, the dolmen of Mont Grantez, as I have just said, stands on a hill 200 feet above sea level and about half a mile from the shore line. It is on an area which is covered with sand to a depth of two or three feet and which rises into dunes four or five feet higher. This sand has not been deposited within recent centuries—the

* Bulletin of the *Société Jersiaise* for 1882, p. 324.

sand from the present shore does not reach this spot, nor cover the arable land at the foot of the hill. Moreover, fragments of Gallo-Roman pottery occur, not beneath, but *within*, the sand layers, indicating that sand was present on that spot in Gallo-Roman times. The sand was therefore derived from a shore which now forms the flat grass-covered low-lying area at the foot of the hills at the end of the period of land subsidence which followed the forest epoch, and when the land stood some 25 feet lower than it does at present.*

That the dolmen was erected at a time prior to the deposition of sand is further shown by the fact that it stands directly on the firm yellow clay which overlies the rock of the district. It then follows that it was erected prior to—at the least the termination of—the period of subsidence which directly followed the forest epoch, and in all probability about the same time as the submerged dolmens and menhirs that stand on the peaty bed of the old forest beyond the shore line.

Let us now turn to the l'Islet dolmen in Guernsey. This stands upon that thin layer of black vegetable soil which,—beneath the sand layers and dunes of all our low shores,—can be traced as an inland extension of the great submerged forest bed without. No sand had reached its site when it was erected, so that, this being a low flat shore, the sea must have been distant.

In the dolmen was found an urn of rather remarkable form, one with handles on two sides and

* There are abundant small pebbles mingled with the sand, which could not have been carried by the wind from the present coast line.

projecting bosses or studs between them. This form, although it is said it persisted into the age of bronze, goes far back into Neolithic times, for I have portions of no less than three which were obtained by myself and fellow workers from deep among the roots of oak and hazel in the submerged forest bed. This, coupled with the fact that the shore was so far away that sand could not reach its site, implies that the l'Islet dolmen was erected in the forest period. Further, within the peaty soil of the submerged forest, the pottery fragments, stone axes and mullers that we find so plentifully, are *identical* with those we find in the dolmens.

Accompanying the burials in the dolmens, we find among the relics of food offerings—the bones and teeth of horse, ox and goat,—plentiful remains of the red deer, an animal which, with a dense population, could not have existed on small insular areas, but which suggests extensive hunting grounds.*

Such vegetation as forms the forest bed around our coasts—oak trees which measure as much as four, and even five feet in diameter, hazel and alder, could not grow on a flat shore in proximity to the sea, for salt spray would kill off their foliage and salt water would infiltrate to their roots. We have

* The presence of limpet shells with some of the interments, indicating proximity of sea, does not negative this evidence, but only shows that the dolmens were still in use when land subsidence had so far proceeded as to render sea accessible at certain points. A study of the ordnance chart will show that the sea could have been within half a mile of Grosnez Point, while land still stretched five miles westward of St. Ouen's Bay, and Jersey was in one with France,—joined not only on the East, but on the South. Also that it reached within half a mile of Hanois whilst Guernsey was joined to Jersey, and consequently Continental.

present day evidence of this fact in St. Ouen's Bay where, even a mile from the sea, the few trees that are present are gnarled and stunted, leaning landwards and stretching their few branches away from the unwelcome salt-laden wind, so that it was not possible for the grand oaks to have been living whilst the sea was less than five miles away.* This means that even in that portion of the forest period, the land must have stood at least 100 feet higher than it does at present.

We now have evidence of subsidence until the sea reached a level 25 feet higher than it does at present—a subsidence of 125 feet; and marine deposits cover the coast portions of the forest bed.

Land elevation then sets in, and the forest bed, for a long distance around the shore—with marine sand and clay upon it—becomes dry land and is clothed with vegetation. This vegetation is that which now forms our upper peat bed. The elevation was not very great, but observation on various data shows that it was one of about 80 feet.

This was followed by the subsidence which is now proceeding, to the extent of 60 feet. So that since what we may well consider the *end* of the forest period, to the present day, the land has undergone vertical movements to the extent of at least 265 feet.

De Chevrement gives the result of some elaborate observations and calculations as to the rate of rise

* At various parts of our coast, *eg*, Moulin Huet, in Guernsey, Pelcroûte and La Saie in Jersey, trees grow near the sea, but this occurs only in sheltered and elevated recesses, and they are by no means trees of forest type, but are stunted, gnarled and twisted, just partially successful strugglers against adverse conditions.

and fall of land in these areas for the last 3,000 years, a rate which, whilst varying somewhat from century to century, gives an average of a little less than 18 inches per century, and which is a fair estimate on which to count for rates of rise and fall in general.*

Accepting this estimate, then we find that a period of over 17,000 years is required to account for the land oscillations that have occurred since the last generations of forest trees were growing, and yet we find relics of the same type as those of the dolmens, beneath the roots of those forest trees; and dolmens and menhirs themselves amidst the rooted stumps and prostrate trunks. So that this figure—17,000 years—may be taken as a *minimum* for the age of the majority of those structures in these islands, but by no means as their average age.

This has reference but to the later or “Robenhausian” races. The relics of an earlier Neolithic people lie, not in, but *beneath*, the forest bed, and the remains of generation after generation of forest trees lie upon these relics.

To arrive at an approximation of the era of the *early* Neolithic people, we should have to ascertain the time which it took to accumulate the eight to fourteen feet thick of the compressed soil which results from decayed trees, and add this figure to that already given, and this would refer simply to one particular deposit of relics, and not to the time when the race of people whose relics they are, arrived upon

* *Les Mouvements du Sol sur les Côtes Occidentales de la France et surtout dans le Golf Normanno Breton, par Alexandre de Chevrement.—Paris, 1889.*

the scene. These were most likely the people who mingled with the Magdalenians -- the last cave-dwellers of North-western Europe.

De Mortillet's estimate for that time is approximately 18,000 years, but this figure should probably be increased very considerably.

Of the Magdalenian, Solutrian and Aurignacian races, as I have already said, the islands furnish no trace, so when we get back to the last of their Paleolithic inhabitants, the Mousterians, we at once launch into less modest figures.

The sequence of rise and fall of land during this interval is not so clearly marked as in more recent times, and so does not assist us. All we can infer is, that just prior to the advent of the earliest Neolithic people, these areas were insular, and that, when we get back to Mousterian times, they must have been Continental. So for the era of these remote races, we must fall back upon data established in neighbouring lands.

The Mousterians were here when glacial conditions last set in in these latitudes, as is witnessed by the boulder clay which lies upon their abundant relics.

According to the astronomical theory (see the conclusions of Prof. James Geikie, Sir Robert Ball, and others), this was between 200,000 and 300,000 years ago; whilst, according to de Mortillet and others, who question the astronomical origin of glacial episodes and rely upon geological evidences, it was from 150,000 to 200,000 years ago.

Taking the lowest of these estimates, which is a very modest one, we can then safely assume that

150,000 years have elapsed since the final occupation of our cave-dwellings.

To get back to the Acheulian period, and its immediate predecessor, the Chellean, both represented locally, it is necessary to add at least another 100,000 years.

Finally, those implements we find beneath the lower boulder clay and mingled with the pebbles of the early Pleistocene — if not Pliocene — raised beach, must belong to the race of men of which the Heidelberg jaw is a relic. Of this relic Dr. Keith says that the geological deposits above it represent a lapse of time of not less than 700,000 years and that many geologists would be in favour of a much larger claim.

From the various estimates of the era of early man in Europe, I quote examples showing how—as fresh evidence accumulates—the tendency is to increase the figures.

G. DE MORTILLET (1889).

From man's first appearance on the scene (in Europe), 230,000 to 240,000 years, of which the—

| | |
|--|---------|
| Chellean period occupied | 78,000 |
| Mousterian period occupied | 100,000 |
| Solutrian period occupied | 11,000 |
| Magdalenian period occupied | 33,000 |
| Neolithic and all subsequent periods say | 18,000 |

PROFESSOR STURGE (1911).

“The Neolithic period goes back to between 200,000 and 300,000 years.

The Cave-dwelling period lasted from 200,000 to 400,000 years.

The Drift period (Chellean, &c.), 700,000 to 1,000,000 years."

This would give for the total human period (in Europe), from 1,100,000 to 1,700,000 years.

DR. KEITH (1911).

Writing of the Neanderthal (Mousterian) race only, Dr. Keith, says :—

"Thus we have evidence that at a distant time, dating from almost the beginning to almost the end of the Glacial period—a period variously estimated at from half to one and a half millions of years—Europe was occupied from the centre of Germany in the North to the Pyrenees in the South, from Jersey in the West to Croatia in the East, by a type of mankind quite unlike modern races. As yet we have only obtained a few glimpses of the men of this vast period. They appear suddenly and they seem to disappear without leaving a trace."*

* *Ancient types of man*, by Arthur Keith, M.D., L.L.D.

CHAPTER XI.

THESE ISLANDS AND THEIR PEOPLE
IN PREHISTORIC TIMES.

IF not altogether satisfactory, it is at least interesting to reconstruct, as it were, to the imagination, the scenes that met the vision of those races that lived here in the far past, and from their environment and the relics they have bequeathed to us, picture their ways of life.

The Channel Islands, composed as they are of materials which best resist erosion and denudation, and without evidences of any rivers which might have cut their soils and altered their contours, retain in fair degree the geological features they must have presented during the whole of the human period.

Sea erosion has, of course, to some extent scarped their shore lines, whilst denudation through atmospheric agencies, and the slip from higher to lower levels of rubble drift during glacial times, have to some extent reduced their elevations. But it is only in detail that things have thus altered, the general plan remains.

For many miles around, the sounding line enables us to trace the undulations of the surrounding plains which, now beneath the sea, have again and again been land surface, whilst faunal and floral relics enable us to ascertain their varied climatic conditions.

The courses of the principal ancient rivers are still

clearly defined, and hill and dale to a considerable extent, are well marked.*

Twenty miles North of Guernsey, we see in "Hurd Deep" the bed of a great river, an extension of the combined Seine and Somme, and we trace it past the North of Alderney and Cape la Hague.

Between Jersey and the rocky reefs that lie to its North,—the Ecrehous, Dirouilles and Paternosters,—the line of deeper soundings defines the course of a lesser stream—an extension of the Aye which now meets the sea at St. Germain-sur-Aye, and which had for tributaries the streams from Surville and Portbail. This river flowed past the South of Guernsey and probably joined the "Seine-Somme" near its estuary.

Between the Southern side of Jersey and the elevated area now represented by the extensive Minquiers reef, flowed the Sienne, which now reaches the sea at Blainville, whilst to the South of the Minquiers area, the Rance, with a number of tributaries from more Eastern Brittany, flowed in a North-westerly direction.

From this great plain rose the rocky eminences which now form our islands and their numerous surrounding islets, and there is evidence that, at least in interglacial and in post-glacial times, the whole of this great area was densely wooded.

At a period prior to the deposition of our lower boulder clay, there is evidence of a great subsidence, and these islands were then of considerably less area than they are at present. This is well marked in all

* See note on submerged valleys in addenda.

the islands, and especially in Guernsey, by the 25ft. raised beach which just underlies the lower boulder clay.*

That man—whether fully qualified for his title or not—had lived here prior to that period of subsidence, is shown by the implements that occur amongst the pebbles and gravel of the raised beach just named.

Of this race we know little, probably it is represented by the Heidelberg jaw, perhaps by the Java remains, and comes under the still—in some degree disputed—"Eolithic period."

Before we again find human evidences, there must have been considerable land elevation, and the race next upon the scene must have been the early Chellean, the men who made the massive and crudely chipped implements shown in Plate II. This race must have been strongly represented, for its relics, in the way of crude flints, are plentiful. We meet with them in St. Ouen's Bay, at Grève d'Azette, in St. Clement's Bay, and on the North coast of Jersey. They occur beneath the boulder clays of Green Island, and in the clays of Guernsey.

In those days the climate of these regions must have been warm, as we have already seen, and the rose-laurel, the magnolia, and to some extent the palm, thrive well. As I have already said, owing to the decalcifying nature of our local clays—or rather to the absence from our soils of agents which would neutralize the decalcifying action of the carbonic acid brought down by rain—we find, at this horizon, no animal remains in association with these human

* See Plate I.

relics, but from localities where conditions are more conducive to bone preservation—on the Continent and in England—we see that the men of that time had for their congeners a warmth-requiring fauna. They had the hippopotamus, *Elephas meridionalis*, *Elephas antiquus*, the sabre-toothed tiger, two species of rhinoceros, the lion and bear, a species of horse (*Equus stenonis*), and many species of bovids and of deer.*

We next encounter the evidences of a glacial episode. Fragments of rock, detached by frost, and masses of clay washed down by the floods of melting snows, pour into the valleys and fringe what are now our coast lines, forming our local lower boulder clay.

Then as these glacial conditions pass away we find evidences of another race of men—the Acheulian. The transition from the one to the other is not clearly defined, either here or elsewhere, but at the horizon at which, in Jersey at least, we find the Chellean relics—that is, just beneath the boulder clay which marks the glacial episode just mentioned — no Acheulian relics have so far been traced. In fact the only local relics clearly referable to the Acheulian period are found on moorland, and on the shore line where there has been erosion of land, so that their actual geological horizon cannot be traced.

How long this period lasted—the period which covers the presence of the “drift men,” as the Chellean and Acheulian together are termed—is a point on which there is vast difference of opinion.

* See “Faune Chelléenne,” in de Mortillet’s *Préhistoire*, pp. 558, 559.

De Mortillet estimates it at 78,000 years, whilst Professor Sturge claims for it at least 700,000 years.

As to the physical aspect of these drift men, if—as there seems good evidence to prove—the Galley Hill, Ipswich and Piltown remains are representative of them, they differed but little from modern man, except perhaps in a simian character of the jaw. They were of fair stature, with large brain capacity and quite unlike the men who next appear upon the scene—the “Mousterians.”

The conditions under which we find the relics of these people afford no clue as to their probable ways of life; all that we can infer is that they were hunters and lived in the open.

However unsatisfactory is the evidence we can gather of these very early occupants of these lands, our horizon clears considerably when we arrive at the Mousterian period.

As once more genial conditions were passing away and the ice-sheet again began to spread down from the North, the Acheulians disappeared from the scene, no doubt moving South, and were replaced by the well-known and well-studied men of the Neanderthal type.

Whence came those strange and more primitive men has not been shown, but it seems likely that they were a people from the North, hunters of the reindeer and the mammoth, and that, as advancing Arctic conditions forced the reindeer and the mammoth from their more Northern Homes, these men followed them hither.

Dr. Keith says of Mousterian man : " He appears for a time and then gives place to modern man."

Some anthropologists consider that this type of humanity is distinct, and does not form part of the evolutionary stem which culminates in modern man, but this is a point for anthropologists to decide and does not concern us here.

Of all the early races, the Mousterian is that which is most fully represented in these islands. Of this race were the men who occupied *la Cotte à la Chèvre* at St. Ouen, and *la Cotte* at St. Brelade, and whose well-defined flint implements are plentiful, not only in the caves but just beneath the upper boulder clay and to some extent scattered over the moorlands.

The many discoveries of skulls, and even of complete skeletons of these men, have enabled anthropologists to decide with considerable degree of precision what they were like, and the description given by Professor Huxley many years ago, although he had but little material at his command, holds good.

This authority says : " They were short in stature and powerfully built, their low, depressed skulls had curiously projecting brow-ridges, and their jaws, of brutal strength and ferocity, sloped downwards and backwards, without that characteristic of all modern men—the chin prominence ; whilst their thigh bones, by their form, suggest that they must have walked with a bend at the knee."

Another of the pioneers of science, de Quatrefages, after describing them in much the same words, adds :

“Strangely savage must have been the aspect of these men.”

When we stand beside the hearths in the cave-dwellings of these people, survey the relics of their feasts, take up and examine those flint implements that they had been the last to handle, and consider the environment of their day, we can in some measure picture their ways of life.

When they lived here the land probably extended to where the 100 fathom line marks the limit,* and the plain, 140 feet below, was clothed with forest in which no doubt the pine then predominated.

Visible from the higher levels, over the tree tops, and from fifteen to twenty miles away, was rising land, the now sister islands of Guernsey and Sark, and a river—the greater Aye—flowed from east to west, at no great distance from the foot of the cliff in which was their cave-dwelling at St. Ouen.

The river broadened here and there, to form shallow lakes, one of which is still well defined on the Eastern side of Jersey.

The mammoth and the woolly rhinoceros, two species of wild horse, and the great Irish elk were there, as well as herds of the primitive ox or urus, and of reindeer, so that Mousterian man had no lack of food. Nor was he altogether a carnivore, the ground-down surfaces of his powerful teeth indicate that he consumed coarse vegetable food that required much mastication, and flat stones, with accompanying worn pebbles, show that he pounded or triturated grain or

* See Geikie's map of Europe at close of Great Ice Age.

seed of some kind. Flints, so trimmed as to show clearly that they were used as scrapers, and others so pointed as to represent borers, indicate that he knew the art of dressing and joining skins, and so had clothing.

The question has often arisen "Was he a cannibal?" On this point we have but circumstantial evidence, but what we have is not in his favour.

In the "Cotte" cave at St. Brelade, the human teeth—all that was left of what must have been a skull—were found, not in the position in which their owner may have died or had been reverently laid, but against the wall rock of the cave, behind the hearth, and mingled with broken bones of ox and reindeer. Again, at Croatia, human bones—some split to obtain their marrow, and others showing evidence of roasting—lend strong support to the assumption that he was not particular as to where he drew the line in his *menu*.

He was not a model of hygiene, and his combined home and workshop—judging by the fact that the floor was chiefly composed of animal remains—must have been unsavoury in the extreme.

His was certainly the "simple life," but it must have been a precarious one, for the wild animals that roamed the land were not all of the peaceful nature of those named. A huge tawny lion, a bear of double the proportions of its modern representative, the leopard, and wolves in great number were among them, so that our Mousterian man must have been the hunted as frequently as the hunter.

As glacial conditions intensified and the winters were long and severe, his lot must have been especially hard. The rivers were frozen over the greater part of the year. Snow capped the higher lands continuously, and its summer meltings must often have flooded his home. In the "Cotte" of St. Brelade, we see that such floods washed clay and large boulders on to his floor and over his hearth, and that—*faute de mieux*—he resumed occupation on the top of these, whilst at all times moisture dropped from the roof and trickled down the walls.

Among his relics we find no evidence of arms of propulsion—no arrow tips,—as among the relics of his still far off successor, Neolithic man. It would seem that bow and arrow was a complication beyond his inventive capacity, whilst experts hold that his pointed flints were never hafted. His method of obtaining meat supplies must therefore have been the trap or pitfall, for we cannot imagine him attacking wild animals, even the ox, armed simply with club, stake, or hand-held flint.

His larder was however well supplied, for remains of reindeer, horse, ox, red deer and goat plentifully strew his floor. Even head and leg of rhinoceros figure amongst his leavings.

He took some measure of thought for the morrow, and we find at "la Cotte" remains of wood, including large boughs, stacked near the hearth.

The cave was his home and his castle. It afforded him shelter from storm and blizzard, and at night, with a fire on the outside, security from attack by

wild animals, for in the invention of fire he had invoked a guardian angel for when he slept.

Was he a monogamist, or did he incur plural responsibility?

Polygamy is not suited to the wild, where life is held on slender tenure, as it must have been in his case, so that the probability is that, like his not very distant relatives, the great anthropoid apes, he was monogamous.

To what extent Mousterian man was represented locally is difficult to decide. There are here—so far as yet discovered—but two caves that have not been invaded by the sea since his era, and both of these have abundance of his relics. But sixty feet lower down the cliffs, all along the Northern and South-western coasts of Jersey, on the Southern side of Guernsey, and on the Western one of Sark, are numerous other caves, the great majority of which are far more extensive (see addenda), and offer better shelter than the two in which we find his relics, so that it is more than probable that they also were occupied. But twice since his era the sea has invaded these caves of lower level, and whatever relics they may have contained have long since been scattered.

As the ice sheet still spread down from the North, these regions apparently became unsuited even for that beast of snow and frost, the reindeer, so that it migrated, as far to the south as Spain, and no doubt Mousterian man followed it, for here we lose all trace of him. His cave-dwellings are deserted, and in the one of St. Brelade glacial drift enters through the doorway and the cleft in the roof and covers his

hearths and his relics with thirty feet of clay and boulders.

How long, in these regions, the Mousterian race endured is a matter on which there is much divergence of opinion, but it certainly was a very long period. De Mortillet claims 100,000 years, but some authorities are for greatly extending this estimate. Dr. Keith for instance, is inclined to multiply it by ten.

After the exodus of this race, and coincident with the deposition of the glacial rubble drift, we have in these islands evidence of a considerable land subsidence ; rubble drift and marine clays, sands and gravels, intermingle at what was then the shore line, this shore line being clearly defined beneath the low-lying portions of St. Helier, and we get a repetition of the geological features that had presented themselves in early Pleistocene times, these areas being not only insular, but of much less dimensions than at present.

When glacial conditions again passed away, new races of men occupied the greater part of Europe, these, in succession, being the Aurignacean, Solutrian and Magdalenian, but as I have already said, no trace of them appears locally. Little Islands such as these had then become, offered those people no means of sustenance, so that here we get a great gap in human succession, and from the crude Mousterian savage we pass to Neolithic man.

We now have evidences of land elevation ; Guernsey is still insular, but Jersey is probably a peninsula.

It is the dawn of the age of great forests, and the maritime plants which at first fringed the emerging

land are gradually replaced by birch, beech, oak and hazel.

Once again man is on the scene—early Neolithic man. We find his chipped flints, utilized pebbles, and the blocks of stone which he has used as anvils for the preliminary shaping of his flint implements. They lie near the surface of the marine deposits of the period of submergence, and beneath the first vestiges of forest growth.

As their generations pass on, and as they are joined by fresh arrivals, we trace these people by their relics at various levels in the forest bed, and presently find that they had acquired the potter's art, making crude vessels from the blue plastic clay which underlies the forest bed. As their numbers increase, we find their places of sepulture. No doubt it was for the more important persons that tombs were constructed. The body was lain upon the soil, either extended or doubled up, stones were placed around, and the flattest stones available were used as a covering.

Whether earth was heaped over these rough tombs we cannot ascertain, for those we have available are buried beneath Aeolian clay and sand. Such are the tombs we find, close set, at Green Island in Jersey, and such have been found in Guernsey.

The mound, or cairn of small stones at Green Island shows however that such careful burial was not the portion of all. The majority were apparently just placed on the ground and stones heaped upon them—a rough and ready means of disposal,—the mound increasing in extent as additions were made.

Unlike the burials of the succeeding race, these bear no evidence of any solicitude for the welfare of the dead. No marks of venerable tribute accompany the interments. No ornaments, amulets or weapons, no red deer's haunch or horse's head, loin of pork or jar of limpets, to cheer and support the deceased on his long journey to the spirit world—so constant with later burials—occur with these.

Perhaps the concept of a life beyond the tomb had not yet been framed.

It is true that the orientation—East and West—of the majority of the tombs suggests some idea of veneration, and yet whilst the tombs are thus oriented, it seems that little attention was paid to the position of the body. In the Green Island tombs, one body at least was placed with the head to the East, others with head to the West, whilst one tomb had served for two bodies, or at least for one and a half, for although two skulls and two sets of arm bones were present, it is difficult to see how two entire bodies could have been accommodated within that narrow home.

Remains of horse—teeth and bones—so abundant with all the relics of the succeeding race, do not appear at this horizon. It would seem that the indigenous—and, of course, wild—horse, so abundant in Paleolithic times, had passed away, and that the introduction of domesticated stock had not commenced.

These early Neolithic people were of small stature, and of slender build. Dr. Keith, after careful study of remains from Green Island, estimates the stature

of an adult woman represented there, as under five feet, and the other skulls and bones from that locality are certainly considerably smaller than those of the modern European, whilst shapely brows and sound and even teeth suggest that they were not an uncomely people.

Centuries pass, and we get fresh arrivals from the East,—a round headed people, and one possessed of a higher culture than the last.

These are the Robenhausians. They mingle with the Tardenoisians and now we get diversity of type.

When the curtain rises on Robenhausian times, we can well picture the aspect of these lands. A vast forest has spread far over the erstwhile sea-bottom and not only joined the islands to the Continent, but in all probability established a land connection with Great Britain.*

The old rivers, the Seine, the Aye, the Sienne, and the Rance, run their accustomed course; no longer amid snow and ice, but through rich pastures and deep forest. It is a goodly land and the population increases greatly. Herds of long-faced oxen roam forest and plain and wallow in the streams. The red deer and the wild-boar abound. The hazel and the crab-apple, the strawberry and blackberry, the cherry, the medlar and the wild plum, are there in profusion, so that Robenhausian man is provided, not only with the necessaries, but with many of the luxuries, of life.

When, on such occasions as the tide lays bare the submerged forest remains on the North coast of Jersey, we stand amid the tree stumps at the foot of

* See Addenda.

the cliffs, we can without much call upon the imagination, picture the scene in those Neolithic days.

The trees—the oaks especially—were of great size, and the undergrowth of hazel abundant. The cliffs were tunnelled with caves—over one hundred on this part of the coast alone. Some of these caves were mere rocky grottoes, but many were spacious chambers, entering the cliff for hundreds of feet. These offered cool retreats in the summer heat, and shelter in days of storm. Bracken draped the slopes, and amid the red granite crags towering to three hundred feet above, the furze, the heather and the ling blossomed in profusion. Elegant witnesses of the fact that these cliffs (now assailed by the waves) were once sheltered by woods, are still living there,—the wood-sorrel, the wood-sage, the foxglove, the spurge-laurel, the cowslip and the bluebell,—for these are woodland and not maritime plants.

It was amid scenes like these that the lapidary, who was the armourer and cutler of those times, fashioned his axes from the diorite rock of the vicinity, and his arrow-tips from the flints that were to be found in the marine clay beneath the forest soil. There the potter moulded the plastic clay, and the jeweller made tinkling ornaments from shells and teeth and fancy stone, to adorn the necks and arms of the wealthy.

The potters, it seems, were of the gentler sex, for the nail and finger prints on the recording clay are too delicate to be those of masculine digits.

Masses of blackberry pips bearing evidence of having been squeezed to obtain the juice of the fruit, are found among the food relics, and suggest that man had thus early recognised the seductive properties of fermented fruit juices.

Thus, with a generous climate, and with nature bestowing her gifts with a lavish hand, we should imagine that the life of Neolithic man was a happy one—a perpetual holiday. But when we look deeper into the environment of the people the charm fades, and we read a different story.

Those massive monuments, so abundant on every side, and entailing the transport of blocks of many tons in weight, often from great distances and from the plains to the hill tops, for the honour of the Sun God and for the sepulture of the great, and for no other earthly purpose whatever, could not have been a work of necessity nor a labour of love. They tell—as do the pyramids of Egypt—of forced labour. The government was most likely in the hands of a sacerdotal caste and the priest held sway, so that the yoke of servitude must have galled the neck of the many. There is good evidence that religion, as de Mortillet says, was exploited as a powerful means of domination.

As to the religion of these people, it seems clearly shown by the orientation of the dolmens, and alignments, as well as by mystic signs on some of the stones in Brittany, that it was sun-worship. The belief in life after death is shown by the articles placed beside the dead—weapons, ornaments and food. Not only

living beings, but things inanimate, had apparently a spiritual counterpart. The culture of these people must have been very like that of the Mountain tribes of British Burmah,—the Karens.

Bearing on the customs and beliefs of these, Mr. C. T. Bingham, who lived for five years among them, relates the following anecdote:*

(He had just witnessed at early morn, the burial of a child by its parents).

“As the light grew stronger, I saw that this lonely grave was not the only one on the spot. On my right was a mound on which lay the betel-box, the pipe, the haversack, and ‘dah’ (or chopper knife) that in life had been his who lay beneath.

“I turned to rest on the trunk of a tree, when I heard the sound of footsteps. The childless man and woman were passing.

“I knew the man, and I spoke to him. ‘Whose grave is that?’ I asked, pointing to the mound with the betel-box and ‘dah.’

“‘One of the men of my village,’ he replied, ‘he died some months ago.’

“‘Why do you leave his betel-box, haversack and ‘dah’ on the grave? What use can they be to him?’

“‘It is our custom.’

“‘But why?’

“‘His ‘lah’ (Spirit) will require them.’

“‘But you see his ‘lah’ has not taken them. They are rotting away.’

* *Progress* 1883, page 266.

“‘Oh no,’ very promptly, ‘what you see are only the outer form of things. Their ‘lahs’ are gone away and are with his ‘lah.’

“‘Where?’

“‘In another world below this one.’

“‘And so people’s ‘lahs’ go into another world and work as on this?’

“‘Yes; and if they have no haversack and no betel-box, and no ‘dah,’ how could they get on? How could they cut down trees and cultivate rice for food if they had no ‘dah?’

“He added, after a pause:

“‘So our people say, but I don’t know, I am ignorant, I am but a poor jungle fowl.’

“‘But,’ I persisted, ‘how do your people know that it is all true—that the betel-box and other things have ‘lahs’ or even that man had a ‘lah’?’

“The Karen was silent for awhile, then he said:

“‘My child is dead, his body is there. It cannot move; yet he will come to me in my sleep—not his body, but his ‘lah.’ So also I lost an axe long ago in the woods. It fell in the forest and must have rotted away long ago, yet I held it last night in my hand. So it must have a ‘lah.’”

When we consider the relics which accompany the burials in the dolmens—the implements, battle-axes, ornaments, the food material and the earthen vessels—we cannot but conclude, as I have just said, that the culture and mental calibre of the Robenhausians were not unlike those of these hill tribes of Burmah.

It seems to me that the term “Cinerary urn” is too often applied to the vessels found in dolmens.

Of the large number of urns found in Jersey and Guernsey, only two to my knowledge contained ashes, and it is by no means sure that these ashes were the results of cremation.

One, found in the l'Ancrese dolmen and which is now, with its contents intact, in the Lukis Museum in Guernsey, had been closely packed with limpets and mutton, and one, from the Mont Cochon dolmen in Jersey, contained mutton bones.

Most of these urns are found empty, and most frequently upside down. Is it not then probable that the majority of these were—like the accompanying implements and ornaments (and like the “dah” of the Karen)—simply intended for the use of the deceased in the Spirit world?

Abundant food was placed with the body of the deceased. In the Grantez dolmen, with the eight interments there found, were shells of limpets totalling to quite two bushels, and bones of ox, horse, deer and goat, that represented a meat supply of close upon the weight of the dead humans.

As we study the dolmens, from those far out on the submerged forest soil to those that bear evidence of a return of the sea to the vicinity of the higher land, we see that many centuries—if not many tens of centuries—elapsed while dolmens were in use, yet in this great period we see no signs of progress in the culture of the people. It is true the pottery is of rather finer texture with the later interments, and the ornamentation perhaps a little more elaborate, the irregular dots and scratches being replaced by circles, chevrons and scrolls, but that is all. No attempt is

made at the delineation of a flower or any other object in nature—nothing but simply conventional or mystical patterns. The grand, artistic, nature-inspired work of the old Magdalenians is gone—smothered, perhaps, by priestly edict.

Ages roll on, and we note a change in the aspect of the land. The unceasing deformation of earth's crust is bringing the forest plains beneath the waters, and the salt sea is creeping far up the river estuaries. No generation marks a change. With those people, as with us, the contours of the land were ever the same. Neolithic man was losing his territory, but was not aware of the fact. Later generations could gather limpets from the rocky coast to the South-west of Guernsey, and the last ones, from the North-west of Jersey, and whelks and cockles could be obtained from the sandy estuaries.

Fresh races of men now come on the scene, men with weapons and ornaments of bronze. They mingle with the stone workers and we get the overlap.

Soon the islands are reduced to the meagre proportions which had been theirs several times before, and the waters cover all the land which at this day is less than five and twenty feet above the sea.

What the dwelling places of the Robenhausians were locally, we cannot tell. In Ireland they were structures of wood and stone erected upon islets—"Crannoges." In England, and in many parts of the Continent, excavations in the soil—"Pit dwellings." In Switzerland, structures of wood erected on piles out in the lakes,—“Lake dwellings” or “Palfittes.”

In these islands we cannot trace as much as one stone laid upon another to suggest a place of habitation, nor do they seem to have occupied the caves. Massive stone structures to accommodate the dead are on every side, but we find no relic of any accommodation for the living. It then seems probable that they must have dwelt either in tents or in huts of wood and mud, all of which would of course have perished long ago.

A fresh oscillation of land now sets in, and gradually the margin of the submerged forest—now with from three to five feet thick of marine clay, sand and gravel, upon it—emerges, and vegetation spreads over the newly exposed surface.

Guernsey becomes joined with Herm, and Jersey is once more one with the Continent.

We no longer find a trace of Neolithic man as such—no structure, and no implement, characteristic of the race, occurs on the upper bed of vegetation—now our upper peat bed. It is the age of the bronze worker.

Bronze axes, spears, daggers, knives and brooches, brought from the East and bearing Oriental designs, are being copied. Moulds of them are made in clay, and a few original designs are cut in soft stone. The bronze founder is busy, and there are skilled artificers who work in gold.

There are no local mines to exploit for the necessary tin and copper, nor is there local alluvium to wash for the more precious metal, but Cornwall furnishes the two first named, and the river beds of

Ireland furnish the last—and the trader is already on the scene.

Here again we are puzzled to find the habitations of the people. When we find—as we do many—sites of bronze foundries, they are in open field and there are no remains of walls, or even scattered stones, to indicate a building. Either the bronze founder worked in the open, or in mud hut or tent, which—like that of his Neolithic predecessor—must have been his dwelling.

As to the people who then occupied these lands, we have no clear information, but it would seem that these were a race that came from beyond the Rhine—an Indo-European people,—and it is held that their track can be traced.

We read of Ligurians, of Iberians, of Turanians and of Celts. Of tall fair-haired Celts from the North and of short swarthy Celts from the South, and amid a wealth of terms there seems to be a paucity of precision.*

The only clear point seems to be that it was a fresh immigration from the East—that is, of Indo-Europeans—that absorbed and rendered no longer distinguishable those who for so long had monopolized these lands—the Robenhausians.

Still new races arrive, men who in the valley of the Danube have learnt the art of smelting iron and we

* For this vexed question, see Taylor's *Origin of the Aryans*, and article "Celt" in the *Encyclopædia Britannica*.

soon enter the "Early Iron Age."*

Now the conquering Romans arrive in Gaul. We are close upon the dawn of the Christian era, and have done with Prehistoric man.

The aspect of the land has again changed. The elevation that last rendered Jersey continental has given place to subsidence, and presently it is only at low tide that there is land connection.

(It is to this period—that of the final act of separation—that refer those legends and traditions which tell of the passage on foot of Ecclesiastics from Coutances to Jersey.

These legends I have given *in extenso* in another little book).†

* It is held by some that iron was in use as early as bronze, and that it is only owing to its more perishable nature that we fail to find very early iron relics.

Dr. Closmaduc, in *Garr-inis et son monument*, states that he once found the remains of a large bar of iron beneath the stones of a dolmen in Brittany.

When we consider the complex metallurgy of bronze—the reduction of its constituent metals from their ores, and their correct blending when reduced, and compare this with the facility with which a simple iron ore, such as haematite, could be reduced and rendered malleable,—a result which might occur even accidentally—we cannot help thinking that if the discovery of iron did not precede that of bronze, it was a very great wonder.

† *Geology of Jersey.*

ADDENDA.

THE SUBMERGED FOREST.

(Plate XXI.)

EVEN among those who are in frequent touch with the areas of submerged forest land and peaty soil around the shores of the Channel Islands, there is some confusion with regard to the period to which these deposits belong, and it is probable that very few are aware that two distinct beds are there represented, one comparatively modern and one very ancient. Thus, when after some tidal scour at the period of a low spring tide, peaty soil is laid bare in the vicinity of St. Helier's Harbour, and at the same time peaty soil studded with tree trunks is laid bare in St. Ouen's Bay, it is quite natural to suppose that these deposits represent the same ancient land level.

But such is not the case; the exposure near St. Helier's Harbour is that of the upper peat bed, a relic of Jersey's last continental connection; the great submerged forest bed lies at that spot some six or seven feet below.

Within the harbour, where the bottom has been deepened by dredging, this upper peat bed has been removed, and there—so close at hand—the great forest bed is laid bare. In St. Ouen's Bay, the upper peat bed (with the old marine layer beneath it) has been removed by erosion, and there—as in the Harbour of St. Helier—it is the great forest bed which is so frequently exposed.

Again, where both the lower and upper beds extend to the rising land, they blend, and it is not always easy to say for certain which is under observation.

Further, on many parts of the English and Continental coasts, especially in the estuaries of rivers, three or four distinct peat and forest beds are frequently traced, suggesting that minor land oscillations have occurred which are not recorded in the Channel Islands, or else that some of these deposits are simply the result of landslips or of compression of underlying strata.*

In these islands we have but two horizons of submerged vegetation, and the one most in evidence—as in St. Ouen's Bay—corresponds with the “lower submerged forest,” or “lower buried forest” of the British shores:—the one which is immediately post-glacial, and which in extent and in evidences of duration renders the others of the series very insignificant.

The “upper peat bed” shown at B in diagram C is so scantily represented on these shores that wherever I simply mention “Submerged forest,” this refers to what is usually known as the “lower submerged forest,” which is here so intimately connected with the history of Neolithic man. This striking feature of the shores of Jersey and Guernsey has been the subject of many articles by different writers. It has been popularly supposed that these remains represent the “Forest of Scissy,” which l'Abbé Manet, in 1756, says was destroyed by a storm in the year 709.

* See Submerged Forests, by C. Reid, p. 3 et Seq.

A careful study of l'Abbé Manet's actual writings shows however, that his "Forest of Scissy" was simply such portion of the forest as was represented on the shores of the Chausey islets. "Chausey" being the modern rendering of "Scissy," which in its turn is a shortening of "*Sesiacum*," the Roman appellation of that group of islets. That l'Abbé Manet also mentions the "Forest of Cancale" plainly shows that he was referring to a limited portion of the forest land, and not to the whole of its vast extension.

Moreover, writing as he did a thousand years after an event of which there was but a tradition, and seeing then, as we see to-day, the blackened stumps of trees around the coast, he naturally inferred that these represented the old "fertile land" which tradition said had been destroyed by what was termed "the fatal tide" of 709.

As a matter of fact, if there did occur an exceptional storm in 709—and there is no particular reason why there might not—its work resulted simply in the erosion of the covering layers of the forest bed, which—as in St. Ouen's Bay and Grouville Bay, in Jersey, and Vazon Bay, in Guernsey—were cultivated land.

With all that has been written locally on this subject, not one writer seems to have appreciated the fact that these forest remains represent a period far more remote than that of the last separation of Jersey from the Continent.

Of more interest, and having more bearing on the question of how long Neolithic man sojourned in these regions, is: To what extent did land elevation

take place during that great forest period? Was it simply sufficient to allow a forest growth to fringe the shores of what is present day land—the Continent, the British Isles, or the Channel Islands themselves? Or, was it so great as to render dry the vast area which is now the “Golf Normanno-Breton,” and the English Channel?

There seems to me evidence in favour of the latter suggestion, as peaty soil is brought up by the dredge ten miles to the North of Jersey, and the same peaty soil is fished up from a depth of sixty fathoms to the West of these islands.

Further than this, there occur on the South-west coast of Ireland, several kinds of plants and some land molluscs, which occur nowhere else in Europe except on the Western coast of Portugal. In the ordinary course of the geographical distribution of plants and animals, this indicates a once continuous shore line between those two countries—Ireland and Portugal—and land consequently stretching to where there is now 600 feet deep of water.

Some naturalists hold that such shore line dates from far back tertiary times, and that, although several glacial episodes have passed since then, these plants and animals survived these periods.

(In fact, some authorities hold that in the glacial period the temperature was not lower than it is now, the formation of glaciers being due simply to atmospheric conditions causing greater snow masses to accumulate on the hills. How this would account for an Arctic fauna in these seas is however a

problem which those authorities do not seem to have touched upon.)*

To me it seems more likely that the migration of these forms along the shore line from South to North took place in post-glacial times, consequently in the age of great forests. For even if the plants could have withstood periods of glaciation, certainly one of the molluscs, the great soft, spotted slug, *Geomaculus maculosus*—could not have done so.

Again, in this great forest area from North to South,—Orkney to Brittany,—the flora and the fauna are the same. Oak, beech, birch, alder, hazel, *juncus*, *bos longifrons*, red deer, and wolf. Even the same characteristic beetles, *Geotrupus vernalis*, and *Helops striatus*, are found at each limit of this vast area.

These facts seem to point to more than isolated contemporaneous forest growths, and strongly indicate a one time connection of the whole.

If this be so, and as we certainly trace Neolithic man's relics from beneath the roots of what must have been the first vegetation of the forest, and through its layers to its surface, we must conclude that his sojourn was at least as long as the forest period endured. A period immensely greater than what has been popularly supposed.

In September, 1902, there occurred in St. Ouen's Bay, Jersey, what must be a record exposure of the old forest bed.

I was spending, as is my frequent custom, a week end at the home of my friend, Mr. Dancaester, which

* See Scharff's *History of the European fauna* (Contemp. science series).

is situated about a couple of hundred yards from the shore in this bay, when one morning my host summoned me to the beach to witness an unusual scene. I was amazed, for the fine white sand which usually lies throughout this bay from five to ten feet thick, had disappeared, and in its place there stretched, as far as the eye could reach—North, South and seaward, an expanse of firm brownish-black peaty soil, which was studded with innumerable tree stumps, most of these just level with the soil, but many hundreds of them projecting above it for two or three feet. Between these stumps were prostrate trunks and large branches, with acorns, seeds of telia, and hazel nuts in abundance.

The trees were close set. In one spot I roughly counted over four hundred large ones within a space of one acre. Some of the trees must have been of very large size; one stump which I measured had a diameter of four feet at an elevation of three feet from the ground, and another—at about the same elevation—measured five feet by four feet, but part of the root may have been included in this one.

It is possible to some extent to trace the generations of these trees. At the lower level of the peaty soil are the stumps of such as had died and rotted down whilst the forest was in vigour. These are brownish red in colour and cheesy in consistency. Into these, and through them, the roots of later generations have penetrated, as into ordinary soil. The upper stumps are black in colour, and many of them of almost ebony hardness.

On the occasion just named, I was fortunately able

to obtain the loan of a camera, and secure a couple of photographs of the rather weird scene. Enlargements of these photographs are in the Museum of the *Société Jersiaise*, and one is here reproduced. Very grand indeed, and quite unlike anything we have to-day, must have been this vast forest, through which the Neolithic people roamed.

Extensive exposures of the forest bed take place at l'Ancrese Bay and Vazon Bay in Guernsey, and at Longy Bay in Alderney, but there, owing to a thinner protecting covering of sand, and consequently more attrition, the stumps are worn down to the peat surface.

THE CAVES OF THE COAST.

As already mentioned, there are on the steep coasts of the islands many granitic and other rocky caves.

They occur in all the islands, but are most numerous in Jersey.

Mr. Stanley Guiton, of Jersey, who has made a study of them, calculates that—considering as caves all such cavities as horizontally penetrate the cliffs from ten feet upwards—there are four hundred on the Jersey coast alone.

The number in the other islands has not, I believe, yet been estimated, but there are many of them.

Many of these caves are readily accessible, but the majority can only be reached, either by boat, or at considerable risk by climbing.

Professor Ansted, referring to those in the little bay of *Grève au Lançon*, thus graphically describes them :

“It is difficult to state the number of caverns in the bay with precision; six may be visited in succession at all times except near high water, and all are strikingly picturesque. Some are connected with others by low, natural arches, but most of them are detached. The first enters by an open inlet forty or fifty yards wide, and for more than sixty yards before narrowing the inlet continues in the same direction. On one side however, to the right, it is open for another fifty yards, and to the left becomes a magnificent natural hall, perfectly straight, entering for about one hundred and twenty feet, with a width of nearly fifty feet at the entrance, and gradually narrowing.

“The height is some twenty feet or more, and the floor is strewn with large perfectly rounded pebbles and large blocks of extremely white granite, although the walls are of pinkish and dark grey stone.

“Some distance beyond the first opening is a group of three caverns, connected by a low natural arch and having in the foreground a remarkable group of detached rocks, pinnacles, and large boulders.

“A cascade—the water falling exactly over the entrance to one of these caves, which is situated between two others, all visible from the same point—produces a variety of rock scenery only to be met with in the Channel Islands in this remarkable bay.”

Grandeur than these, we have the caves on the West of Sark, one of which, with a great cathedral-like dome, is still draped with fern. Then the so-called —“marble caves” on the South of Guernsey, the

walls and roofs of which are of glistening white quartz.

When we study these caves, and call to mind the times when—instead of being assailed by stormy waves and filled with salt sea-spray—they stood amid forest growth and were draped and festooned with shade-loving plants, it helps us to picture the environment of the Neolithic people. Or, looking into the ages further back, we can well understand their occupation by the same race of men that occupied the little caves sixty feet higher up the cliffs—the far back Mousterians.

It may well be that some of the abundant water-worn, and all but unrecognisable, flint implements that we find among the shore pebbles, are such as have been washed out from these retreats.

EVIDENCES OF GLACIATION IN THE ISLANDS.

In the foregoing pages I have followed the usually accepted theory that, even at the period of maximum glaciation, glaciers (except in greatly elevated areas—the Alps, &c.), did not form further South than the latitude of Hampshire, but it none the less seems evident that such have played some part locally.

Wherever there are roadside cuttings which expose the original rock of the district as well as its covering of clay (whether the latter be the result of rock decomposition *in situ*, or stratified deposit) the surface of the rock is seen to be fractured, and the fragments to more or less extent, displaced.

Further, in some places, as at Mont Félard in

Jersey, the stratified Archean shale is seen to be crumpled and bent over towards the trend of the valley.

These rock disturbances certainly seem to indicate some immense superimposed and moving weight—in short, *glaciers*.

Again, in Guernsey, Mr. Collenette, and in Jersey, my son, have collected from between the clays and rock surface, fragments of stone, bearing the scratches which are generally accepted as “glacial striation.”

A flint implement, of either early Chellean or Eolithic type, found in Jersey by Capt. H. S. Lawson, has also such striation clearly defined on its flat surface.

It certainly seems that although the land in these Islands nowhere rises to much more than from 300 to 400 feet, glaciers were once present.*

THE PRESENCE OF FLINT IN THE ISLANDS.

Among the masses of pebbles of present day local rock, around the shores of the islands, there occurs a small percentage of flint nodules. The popular notion is that these have been brought as ballast by vessels trading with the islands. But why vessels should jettison ballast around the entire coasts of the islands and around all their adjacent islets, is a question which does not seem to have entered the popular mind. It is evident that these nodules—like the

* It is true that in various works on Geology there is mention of ice-transported blocks from the Channel Islands, from Brittany, &c., but I think that glacial orthodoxy holds Hampshire to be the Southern limit of glaciation at moderate altitudes.

sandstone and limestone pebbles, and the occasional lumps of Devonian shale around our shores,—are the more resistant portions of the rocks by which the tougher islands were once invested, and that flint-containing cretaceous beds must have occurred among those investing rocks.

Within the soil of the islands there occur no flints as natural deposit, and there is evidence that during the period of the great cretaceous subsidence, these areas were above the sea.

It then follows that such flints,—be they worked or unworked—as occur within the clays,—even when such clays have been carried down the slopes as “boulder clay,”—must have been brought there by human agency. This fact strongly supports the evidence in favour of such chipped ones as occur beneath the lower boulder clay, being human artefacts.

Of course, in the raised beaches, even at some height up the cliff sides, flint nodules occur, but these, like the present day ones around the shores, are of extraneous origin, and always accompanied by ordinary pebbles and other beach material.

If cretaceous and flint-bearing deposits had ever lain over the islands, it seems fairly certain that flints would be found in the valleys and rocky recesses, and that there would be here, as in England and on the Continent, “chalky boulder clays,” but there are none.

THE SUBMERGED VALLEYS AND OTHER DEPRESSIONS AROUND THE CHANNEL ISLANDS.

When I state that the sounding line enables us to trace the contours of the now submerged land surface, I am aware that I am expressing an opinion which is against that of some eminent authorities,—for instance, Mr. Clement Reid, F.R.S. * makes mention of the deep troughs around the Channel Islands, and attributes them to tidal scour.

He says of such depressions in general (page 86):—
“We are sometimes told that the various basins, troughs, and channels, shown on the Chart, represent submerged land valleys, and prove enormous changes of sea level in modern times. How a submerged valley in a narrow sea like the English Channel could remain long without silting up, is not clear, the sand banks on either side should tend to wash in and fill up the hollows. The troughs all coincide with lines of tidal scour.”

It is of course perfectly obvious that troughs will be formed where, in shallow waters, the sea runs swiftly through narrow channels, and equally obvious that silting will take place somewhere in proximity as a result, also that silting will take place where material is brought down by rivers. But I hold that the channels and other depressions, and the elevations, around the Channel Islands, are not due to these factors.

Let us consider the long and narrow channel known as “Hard Deep.” We can trace this for

**Submerged Forests*, Cambridge University Press, 1913.

nearly a hundred miles along the North of the islands. It is from one to two miles in width and has a depth of about 200 feet. Its sides slope steeply and are well defined. Moreover, along its banks are several areas of peaty soil representing submerged forest land, which would scarcely be retained there in the presence of either tidal scour or of silting. The configuration of this long channel, as well as its position and direction, proclaim it to be the bed of the river Seine—or rather of the combined rivers Seine and Somme—at each period when, in recent geological time, the land has stood at anything over 250 feet above its present level.

There is a depression four miles off Cape la Hague, known as “la Fosse de la Hague,” which, as we glance at the chart, certainly suggests a line of tidal scour, but when we study its details we can hardly retain this opinion.

It is not a channel, but an elongated basin, some eight miles in length and one mile in width. It is 90 feet lower than the surrounding sea-bottom and as deep at the ends as in the centre.

The water at this part of the coast at mean tide is 300 feet in depth, and the run of tide at the surface but from three to four knots per hour, so that in the basin, the water must be practically still.

In the depression known as “le Ruau” between Jersey and the Ecrehou reefs,—which depression I hold to be the ancient course of the River Aye of Normandy—are oyster beds which have been fished from time immemorial. Each of these oyster beds is in the form of a circle or an oval, marking where,

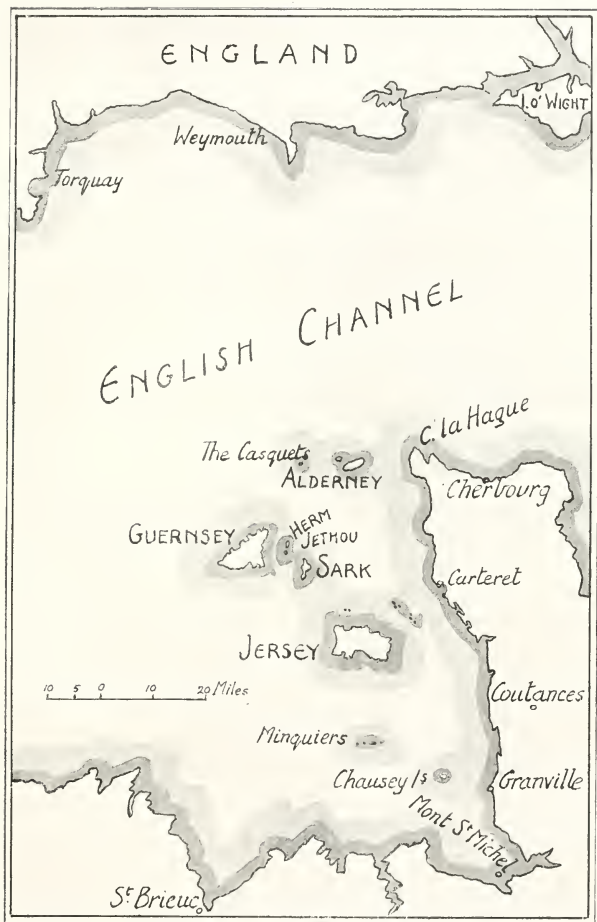
for countless generations, the floating, microscopic, oyster larvae have settled in proximity to, and around, the parent stock—the point of dissemination; thus indicating perfectly still water in that channel, and neither scour nor silting.

If we study the large mariner's chart of Jersey, wherein the details of the sea bottom are minutely given, we note areas of a square mile or two in extent which are forty to fifty feet lower than the surrounding ground and not in the line of any tidal currents. One of these lies to the North of Bouley Bay, and one to the North of St. Catherine, and these clearly indicate former bogs, marshes, or shallow lakes.

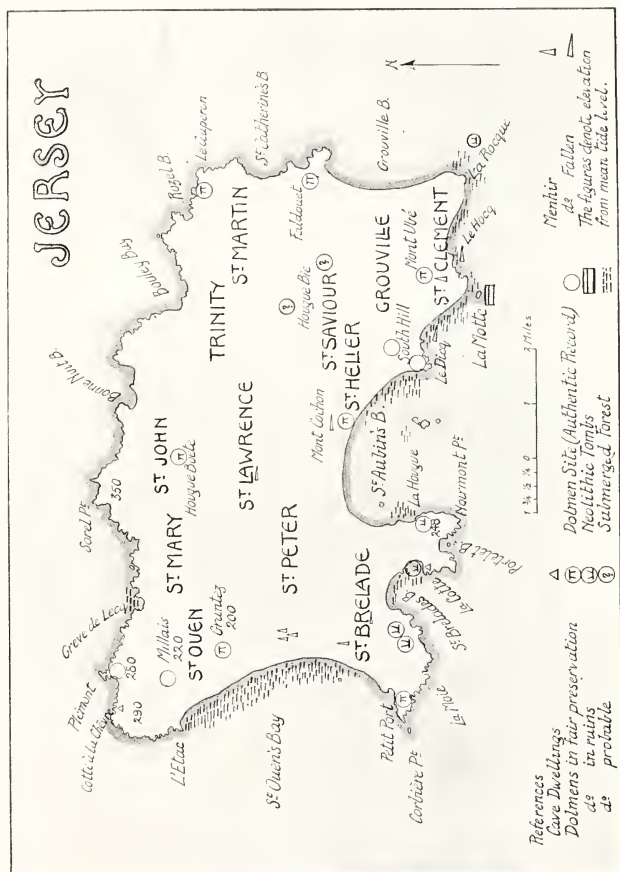
Of course there are shifting sand banks on the sandy coasts, as at Portbail and St. Ouen's Bay, but these are all within the range of either the surf or the ground swell, and so do not impair my argument that off shore, the sounding line is a fair guide to the contours of the former land surface around the Channel Islands.

MAPS AND PLATES.

MAP I.



MAP II.



MAP III.

GUERNSEY

References :-

Dolmen in fair preservation

do in ruins

do probable

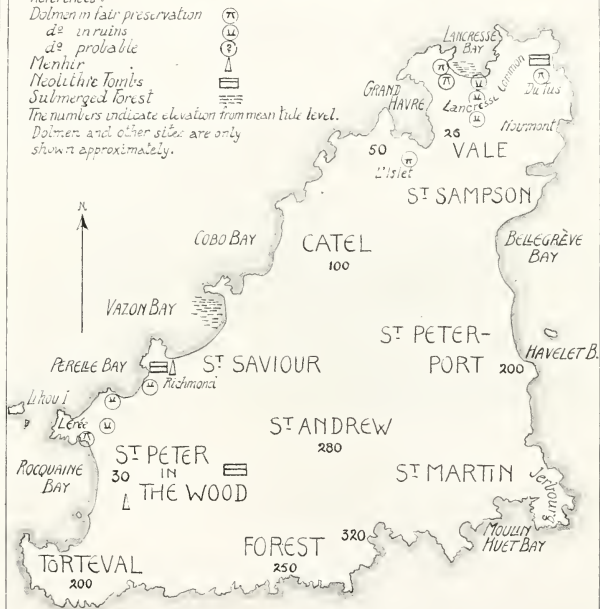
Menhir

Neolithic Tombs

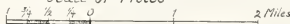
Submerged forest

The numbers indicate elevation from mean tide level.

Dolmen and other sites are only shown approximately.



Scale of Miles



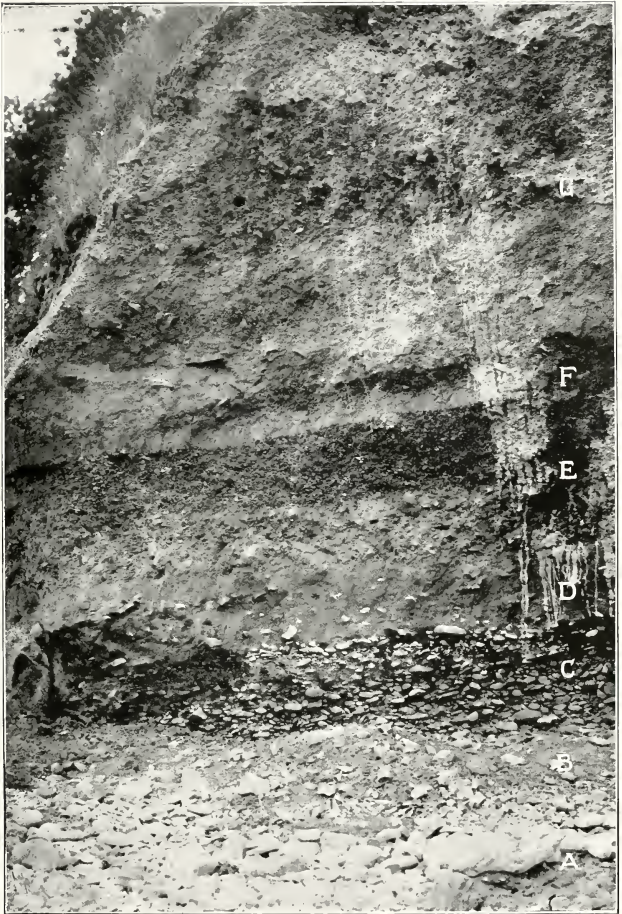


Photo E. F. Guillon.

25700

Vertical Section of Cliff in Belcroute Bay, Jersey.

A Present Day Beach. **B** Clay and Stone Fragments. **C** Raised Beach.
D Consolidated Sand and Fine Clay. **E** Lower Boulder Clay.
F Old Land Surface (Land Shells, &c.) **G** Upper Boulder Clay. (page 43).

PLATE II.



Photo E. F. Guiton.

Early Chellean (or Strepyan) Flint Implements. (page 47).

PLATE III.

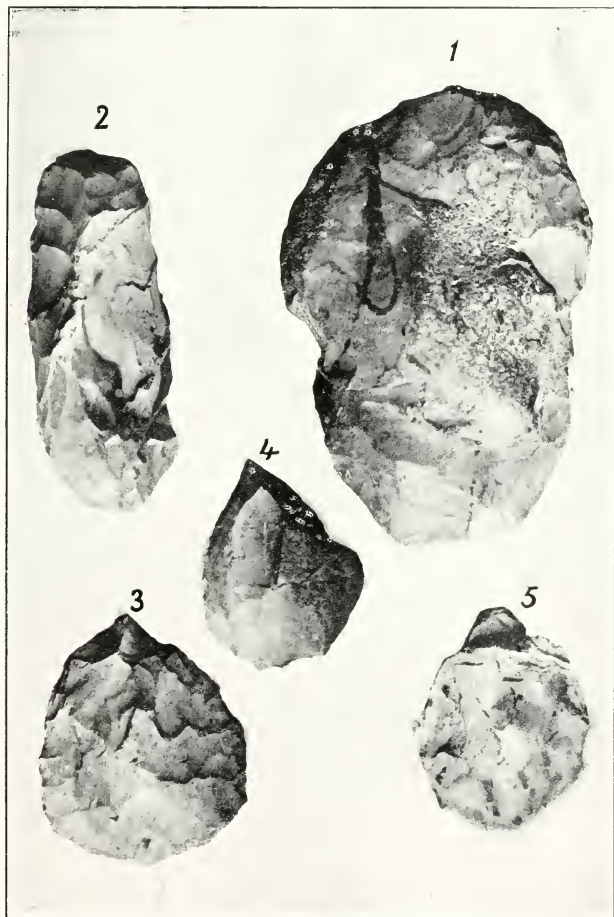
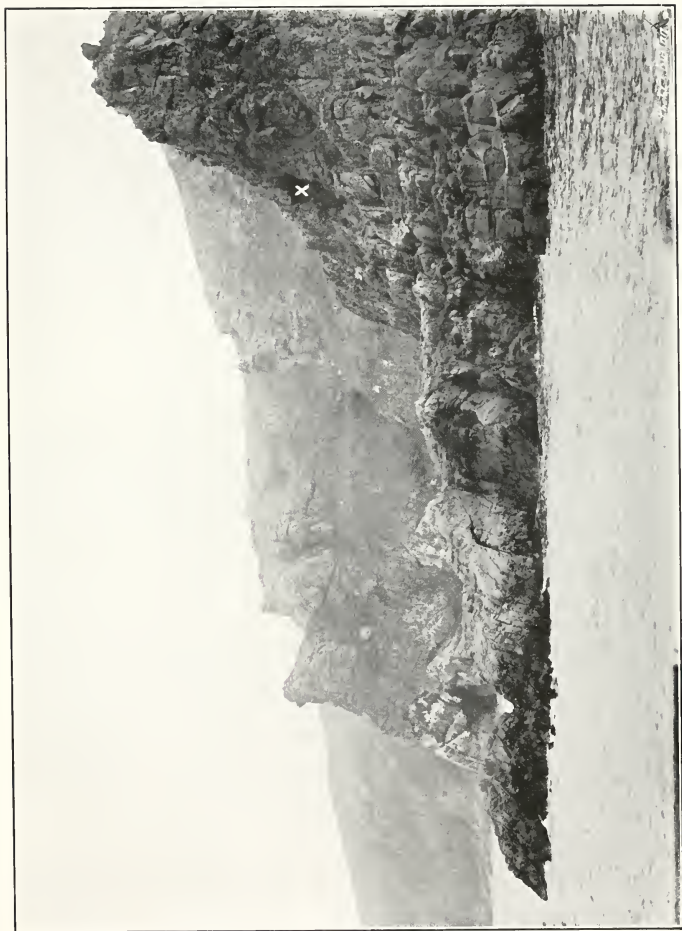


Photo E. F. Guiten.

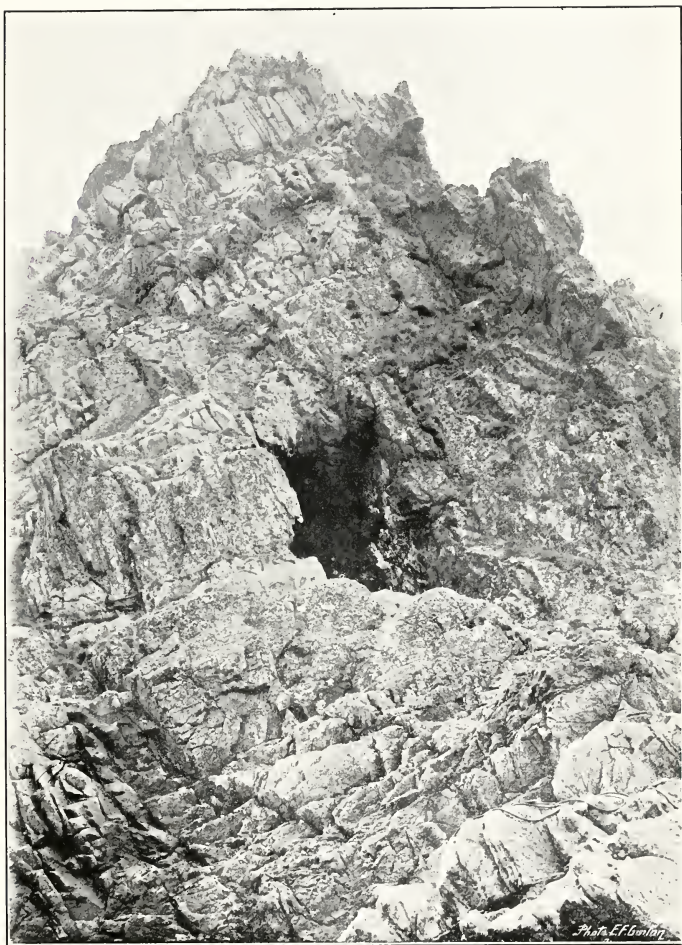
Flint Implements of Acheulian type. (page 47).

PLATE IV.



Mousterian Cave dwelling, "Cotte à la Chèvre," St. Ouen, from the Sea.
(page 49).

PLATE V.



Entrance to Mousterian Cave dwelling "Cotte à la Chèvre," St. Ouen.
(page 49).



Photo, E.F. GUITON.

PLATE VII.



Photo E. F. Guillon.

Entrance to Mousterian Cave dwelling, "La Cotte," St. Brelade, from tide margin. (page 54).

PLATE VIII.



Photo E. F. Guillon.

Mousterian Cave dwelling, "La Cotte," St. Brelade, during exploration.
(page 54).

PLATE IX.

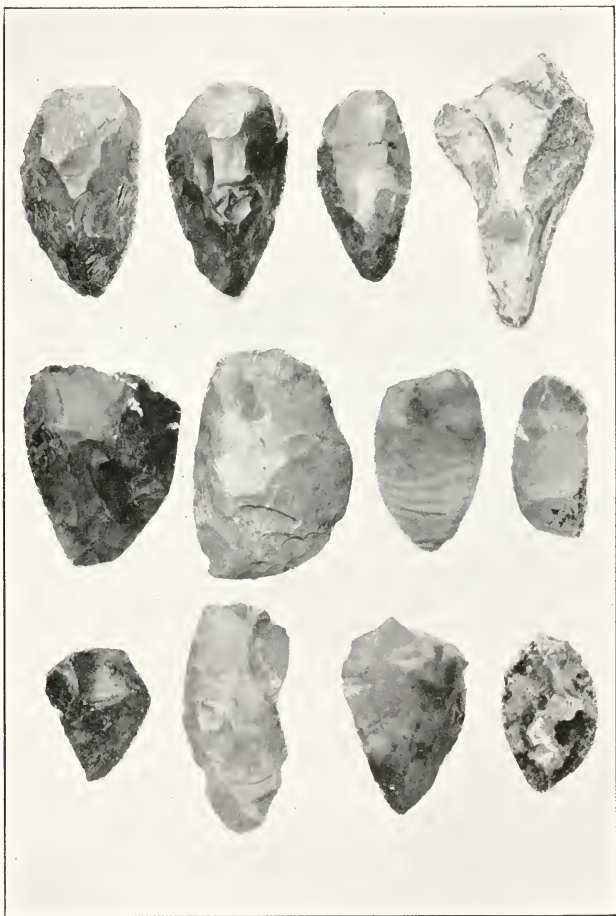
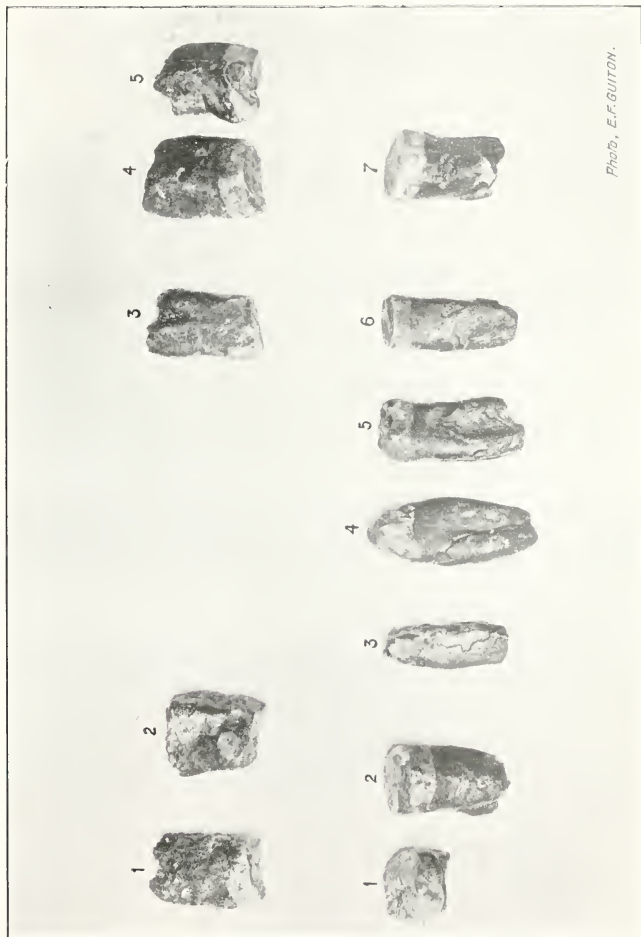


Photo E. F. Guillon.

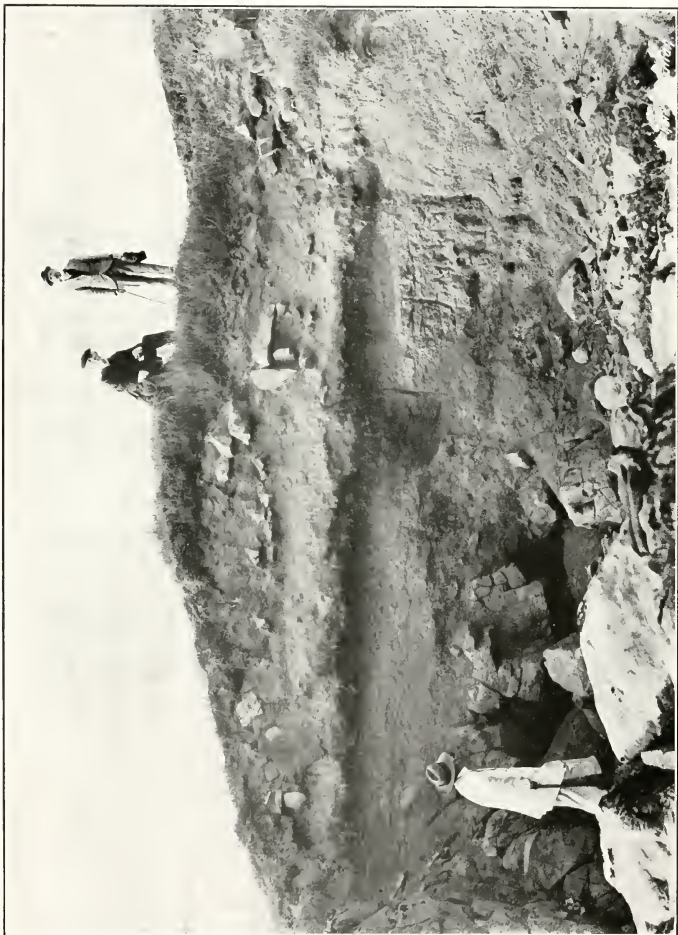
Mousterian Flint Implements from "La Cotte," St. Brelade.
(page 61).

PLATE X.



Photo, E.F. GUITON.

PLATE XI.



Section of Strata, "La Motte," showing section of Neolithic Tomb.
(page 74).

PLATE XII.

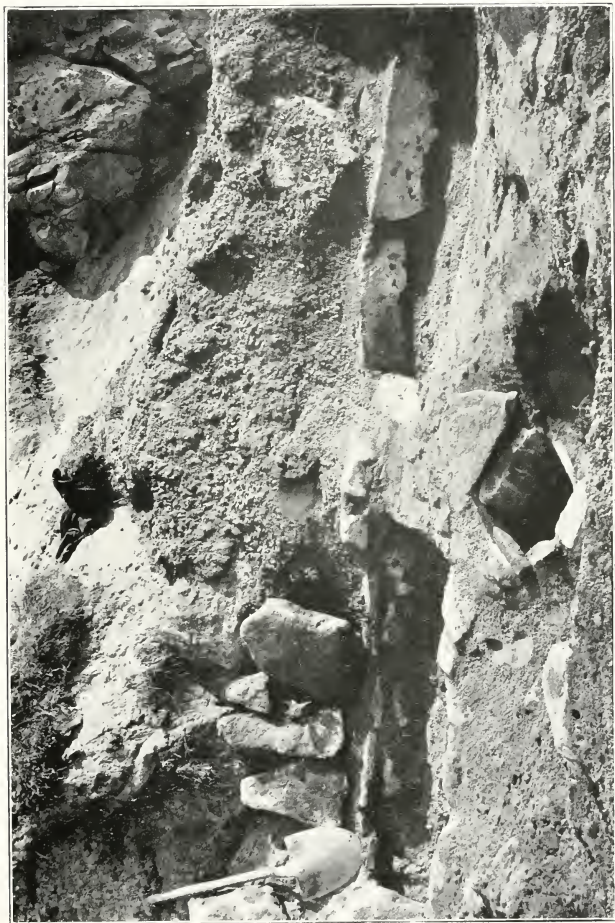


Photo E. F. Guillon.

Neolithic Tombs, "La Motte." (page 74).

PLATE XIII.



Skull from Neolithic Tomb, "La Motte." (page 75)

PLATE XIV.



Photo E. F. Guiton.

Skull from Boulder Clay, "La Motte." (page 78).

PLATE XV.

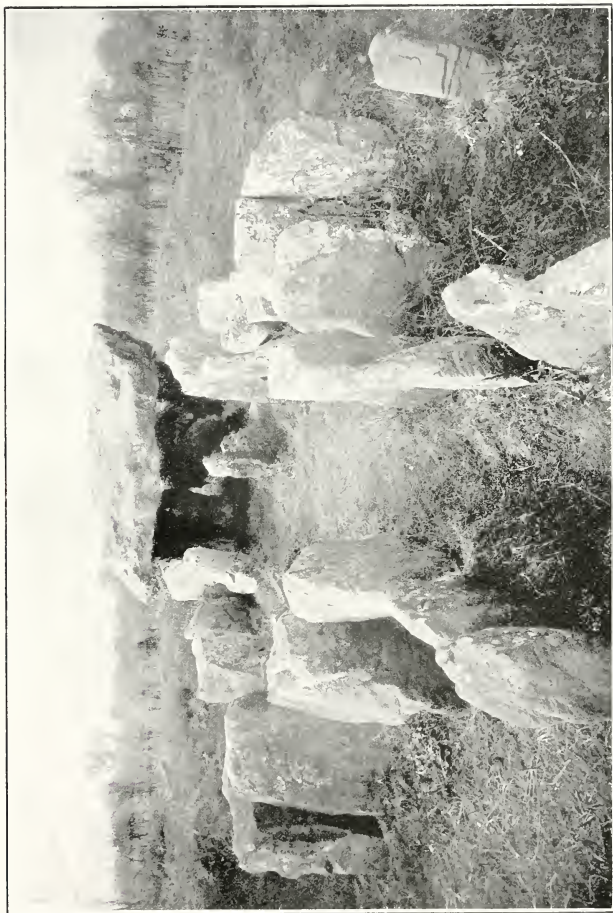


Photo E. F. Gailon.

Dolmen at Faldouet, Jersey. (page 81).

PLATE XVI.

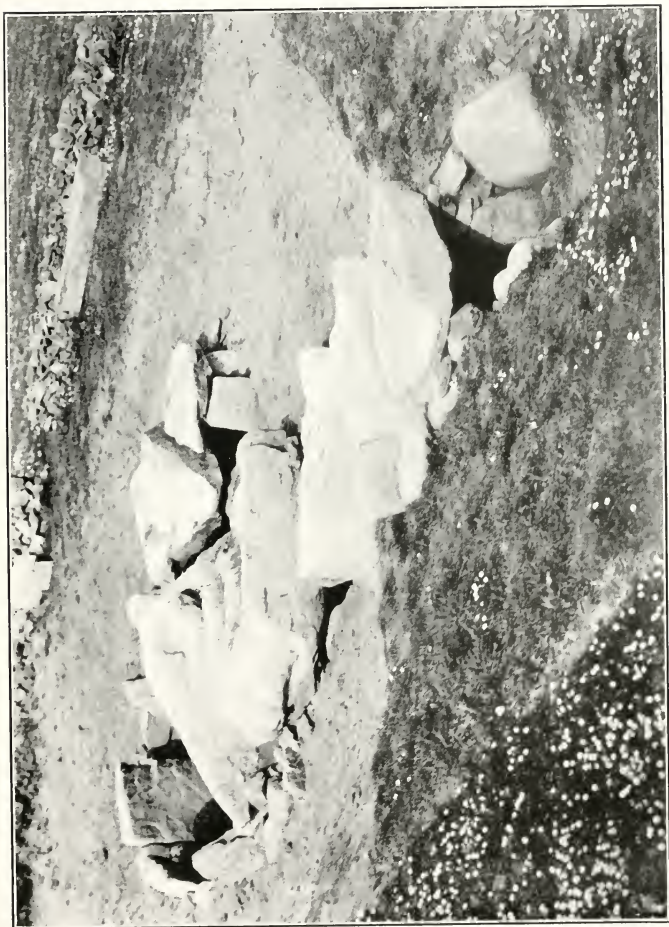


Photo F. F. Guiton.

Dolmen at Mont Grantez, Jersey. (pages 82 and 84).

PLATE XVII.

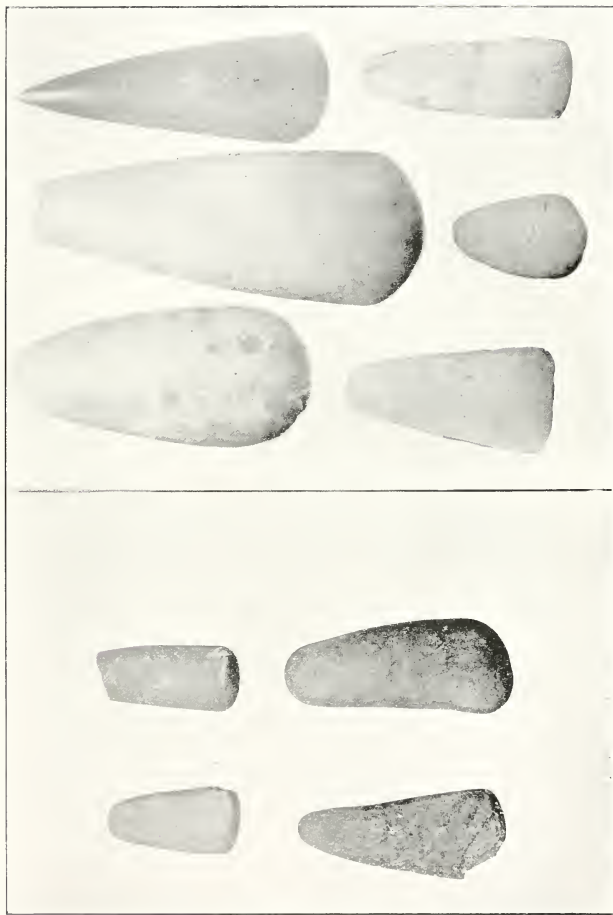


Photo E. F. Ginton.

B

A

Utilized Pebbles (*A*), and Polished Stone Axes (*B*), Neolithic. (page 73).

PLATE XVIII.

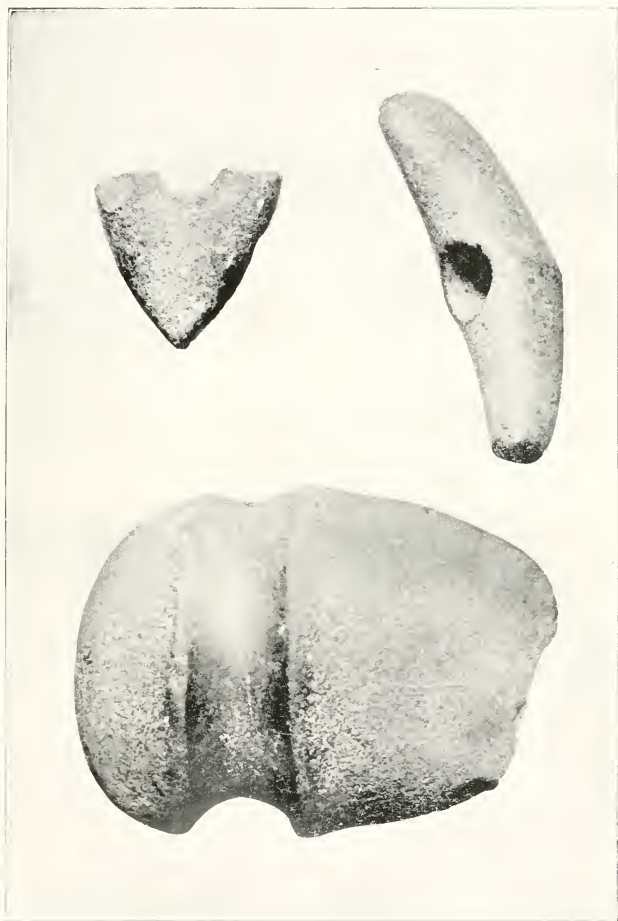


Photo E. F. Guillon.

Neolithic Axe and Stone Hammers. (pages 86 and 87).

PLATE XIX.

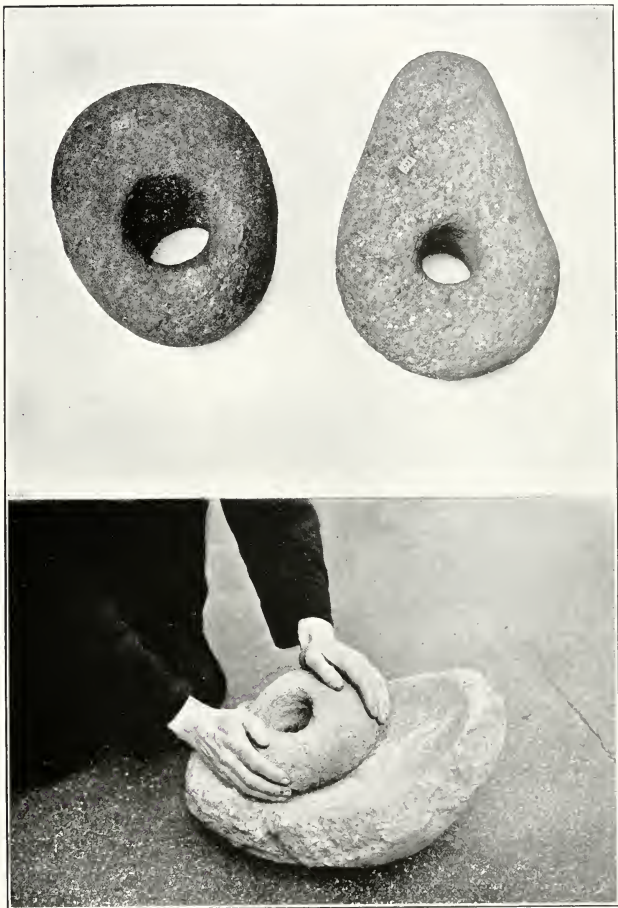


Photo E. F. Gupton.

Granite Milling Stones. (page 86).

PLATE XX.



Photo E. F. Guillon.

Gold Torque. (page 89).

PLATE XXI.



Photo J. Sme.

Submerged Forest, St. Ouen's Bay, Jersey. (page 124).
(The Rock-like Masses are rooted Tree Stumps).

UNIVERSITY OF CALIFORNIA LIBRARY
BERKELEY

Return to desk from which borrowed.
This book is DUE on the last date stamped below.

14 May 49 J M

29 May 52 LA

MAY 25 1952 LU

YC 27727

292543

Sinel

UNIVERSITY OF CALIFORNIA LIBRARY

